Register in discourse.

Register is a discourse variable of immense importance in making communication possible, but because it involves knowledge that several different disciplines claim as their own it has not been studied as much as its importance warrants. Linguists can claim that such linguistic variables as syntax, lexicon, phonology help set and maintain register. Paralinguistic features are also directly involved; e.g. intonation, pausing, and rate of speaking. But social variables context, setting, the participants in the discourse operate both with and apart from linguistic ones. Psychology enters as well, particularly in the process of deciding among alternate behaviors and judging their effects. Sociolinguistics helps in uniting these disparate analyses of register, for its field is that of discourse functions and the ways these interact with each other and with social factors.

Although register has received little direct and sustained attention, the following remarks may help to make clear what is meant by register. Wardhaugh refers to several distinguishing features:

People do have a wide range of choices available to them when they speak: they can be technical or non-technical, formal or informal, conscious of their role or unconscious of it, familiar with the listener or distant; and so on. The consequences will show in the language they use; the amount of technical terminology employed; the kinds of omissions made and tolerated; the types and complexity of grammatical constructions; the standards of grammatical "accuracy" observed. (1976).

Bolinger adds to this list the importance of tone of voice, or intonation (1975). McEdwards describes register as "the product of [one's] conscious and unconscious selection of the topic, the organization, the diction, the vocabulary, the syntax, and the imagery allowed
In his 1961 book *The Five Clocks*, Martin Joos, who refers to register as style, makes a very useful division into five levels. (Presumably because "style" has come to have so many meanings, the word *register* is currently preferred for the matter in hand.) A brief listing of the definitions by Joos follows:

Frozen style is characteristic of poetry and liturgy; not a word can be changed; ambiguity is its special form of politeness; 
Formal style is marked by personal detachment, cohesion of form and organization, absence of participation, explicit pronunciation, grammar that tolerates no ellipsis, careful semantics, and a clear intention to inform; 
Consultative style also intends to be informative but supplies background information, includes the addressee(s) in participation, has complete grammar and clear pronunciation; 
Casual style is marked by ellipsis and slang (participants are on first-name terms and can supply what is left out); background information is likewise absent; there is little reliance on listener participation but treatment of the addressee as an "insider;" 
Intimate style is a personal code shared only by those using it and is full of jargon and omissions that would puzzle others.

Most of the time sign language interpreters work in the middle three levels, of register, although Joos's frozen style might be appropriate in interpreting certain rituals. (The kind of relationship calling for communication in intimate style excludes any third party, even an interpreter, by definition.)

Register is a complicated phenomenon. Its numerous indicators are neither isolated nor static. It is a combination of linguistic, sociological, and psychological factors, some or all of which may determine the register a communicating person uses at any time. This is not to imply that register is impossible to investigate but only to warn that there is rarely an absolute.

The investigation reported here is an attempt to identify indicators of register in selected portions of two lectures presented in ASL, and in the interpretations of each made by two
interpreters. The results are used to suggest desiderata for training interpreters.

The data

Ideally one would be able to determine register immediately and directly from live discourse, but to do so might well require a large part of a lifetime; therefore, in this preliminary attempt to describe register in interpreted material I have used videotaped material, but material so structured that many of the important sociolinguistic variables can be known. The data tapes are professionally produced by Sign Media, Incorporated of Silver Spring, MD (distributed by T. J. Publishers, also of Silver Spring): Interpreter Models Series: ASL-English (Lectures). The series includes two tapes so far, the first presenting interpretation from English to ASL, and the second, used in this study, interpretation from ASL to English.

The producers of the tapes first recorded two half-hour lecture presentations by two Deaf speakers along with two simultaneous interpretations of each. For the final product, they then selected from each a segment of about eight minutes, in which one can watch: (a) the Deaf lecturer's presentation only, (b) that presentation with one spoken interpretation on the sound track, or (c) the same presentation with the other interpreter's voice audible. The Deaf signer-presenters were chosen because they were experienced in Sign presentation to an audience, in working with interpreters, and grew up using ASL. Both are in their 30s, have masters' degrees in education, teach deaf students, have Deaf parents, and are bilingual in ASL and written English. The producers asked them to give 20-30 minute talks on a topic they were comfortable with. They were asked not to read from a paper and to be as extemporaneous as possible. Speaker-signer 1, female, gave a linguistic and cultural discussion of teaching English through ASL. Speaker-signer 2, male, gave a narrative account of his experiences as a househusband.

Nine hearing and five deaf were invited by the producers to be the speakers' audience. The nine hearers were not acquainted with signing and had to depend on the interpreter; the five deaf participants were fluent in ASL.

Filming took place in a specially prepared room. Speaker and podium were on a platform 18
inches above floor level. A collapsible partition split the room in such a way that the speaker could see the people on both sides, but they could not see each other. Thus two interpreters for the speaker could interpret simultaneously for the two halves of the audience, each of which was made up of hearing and deaf persons. The interpreters and the deaf part of the audience had a clear view of the speaker; the non-signing hearing audience was positioned near enough the interpreter to hear clearly.

The interpreters wore headphones to prevent hearing each other's voices and spoke into a separate microphone directly linked to the audio recording equipment. They were selected for their national reputations, the producers' knowledge of their capabilities, experience in conference interpreting, and their commitment to the field. Both were in their 30s at the time of filming; both are bilingual native users of ASL and English with deaf parents; and both have at least eighteen years of professional interpreting experience and ten years experience in training interpreters. Both are considered to be at the top of their profession nationally by the interpreting and Deaf communities.

Interpreter A was born and raised on the East coast, holds a master's degree in counseling, and is currently completing a Ph.D. dissertation in linguistics. Interpreter B was born and raised in the Southwest and on the West coast, holds a master's degree in education, and has done interdisciplinary work on the Ph.D. level.

Determining ASL registers

Verification of the source message register was the first step taken, in order to compare the interpretation register with the original, to determine influence of the source register on the interpretation register, and to examine the interpreters' ability to manipulate register indicators. A native ASL user, who is a qualified and recognized expert in ASL linguistics examined the videotapes of the speaker-signers and judged that Speaker 1 stayed consistently in an upper consultative register. The grounds for this determination are: the topic (linguistics), genre (lecture), goal (to persuade), presentation of background information (not assuming listener knowledge), crisp "pronunciation" (careful sign and manual letter production), reliance on audience comprehension signals (eye contact seeking indications a chunk of information was understood), controlled but present "intonation"
(subdued affective signals of face and body, and force of signs), consistent use of space (distinct and deliberate placement of topics and nouns), non-rapid delivery (relative low speed of signing), and a cohesive and organized presentation (clear and connected points).

The same judge determined that Speaker 2, who was giving a personal account of his experiences as a househusband, was generally in an upper casual register, although he often shifted into consultative register. The grounds for this determination are: the topic (staying at home with his son), genre (personal narrative), goal (to entertain), absence of background information (assuming listener knowledge), little reliance on audience participation (brief eye contact with individual members of the audience), increased ASL "intonation" (distinct and shifting affective signals of face and body and force of signs and body movement), rapid delivery (fast signing and fingerspelling throughout, except for slowing for emphasis), less organized presentation (numerous asides), and strong use of dialogue (impersonating the characters in the narrative).

Selection of data

For analysis I chose a segment two minutes and 27 seconds long from Speaker 1's presentation, and another two minutes and 17 seconds long from Speaker 2's. These provided a cohesive piece of discourse, several subtopics within the segment, sufficient data buy a manageable size for analysis, and little culture-bound information that would have forced difficult decisions on the interpreters. The 147 and 137 seconds of tape provided an overwhelming amount of data to be considered as pertinent to register. I consequently adjusted the depth of the analysis to the scope of the project.

Coding transcriptions

I used conventional orthography in transcribing the data. Phonetic transcription would have provided much unneeded information but did note certain phonetic features; e.g. assimilation ("gonna", "wanna") and elongation of syllables ("s-speak"). I coded for the following keys to register: intonation, pausing, lexical items, increase in speech rate, and sentence boundaries. I also took note of laughter, individual word stress, and run-together words. All transcription work was performed by native English users., and intonation was
evaluated by a recognized expert in phonology. (The Appendix gives the complete transcripts of all four interpretation segments.)

Pausing data was coded by ear and stopwatch to 0.1 sec. accuracy, and it was deemed that 0.4 seconds was a significant delineation point. Stress on individual words, laughter, run-together words, change in speech rate, and sentence boundaries were identified by native-speaker intuition.

Data analysis

Five categories seemed worthy of special attention after I became familiar with the data: speaking rate, pausing, syntax, intonation, and lexical choice. Each was analyzed separately and as related to each other, also for each interpreter across speakers (intra-interpreter). When differences between interpreters appeared, these were compared and contrasted. The categories are presented and discussed below.

Interpreter speaking rate was calculated by counting the number of words in the selection and dividing by the time. The rate of the speaker-signers' original performance was not calculated, although it may be of interest in a related study; and as shown by the interpreter rate, the speaker-signers' rates were different:

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Interpreter A</th>
<th>167.92wpm</th>
<th>Interpreter B</th>
<th>173.47wpm</th>
<th>Speaker 1</th>
<th>167.92wpm</th>
<th>Speaker 2</th>
<th>210.43wpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals</td>
<td></td>
<td>173.47wpm</td>
<td></td>
<td>210.43wpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Rate by speaker and interpreter in words per minute.

It appears that both interpreters increased their rate of speaking because of Speaker 2's more rapid rate of signing (25.32% and 30.01% respectively). The increase in speaking rate is fully in accord with the difference in register of the two presentations. Pauses are not considered in the calculations of speaking rate but were measured and counted and total pause time calculated for each interpreter:

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Interpreter A</th>
<th>0.4 seconds</th>
<th>Interpreter B</th>
<th>0.4 seconds</th>
<th>Speaker 1</th>
<th>0.4 seconds</th>
<th>Speaker 2</th>
<th>0.4 seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals</td>
<td></td>
<td>0.4 seconds</td>
<td></td>
<td>0.4 seconds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pauses under 1.6 sec.
Interp. A 32 43 75 (161, or
Interp. B 42 44 86 89.94%)
Pauses over 1.6 sec.
Interp. A 15 1 16 (18, or
Interp. B 2 0 2....10.06%)
Total pauses
Interp. A 47 44 91 (179, or
Interp. B 44 44 88 100%)

Table 2. Interpreters' pauses by speaker.

The total number of pauses across speakers is similar, with nearly 90% of all pauses being 1.6 seconds or less in length. Interpreter A, however, used many more long pauses than did Interpreter B, and all but one of her long pauses were made during her interpretation of Speaker 1's presentation. I take this as a strong indication in A's interpretation of the register difference between speakers, but see below. the percentage of actual speaking time (seconds of speaking, ss) and pause time (seconds of pausing, sp) is shown below:

<table>
<thead>
<tr>
<th>Speaker 1</th>
<th>Speaker 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Interp. A</td>
<td>Interp. B</td>
</tr>
<tr>
<td>ss 60.9</td>
<td>74.01</td>
</tr>
<tr>
<td>ps 39.10</td>
<td>25.99</td>
</tr>
<tr>
<td>Interp. A</td>
<td>Interp. B</td>
</tr>
<tr>
<td>ss 78.04</td>
<td>82.13 %</td>
</tr>
<tr>
<td>ps 21.96</td>
<td>17.87 %</td>
</tr>
</tbody>
</table>

Table 3. Percentage of speaking and pausing time.

Both interpreters are speaking a smaller percentage of the total time for Speaker 1, another indication that Speaker 1 uses a more formal register than Speaker 2 by allowing more time for audience comprehension, signing slower, and using crisper pronunciation. Again Interpreter A's pause rate appears different across speakers; her overall pause time for Speaker 1 is considerably greater than that in the rest of the 'ps' line.
Syntax

Syntactic difference was assessed by noting sentences as simple and non-simple (i.e. compound, complex, and compound-complex). In Interpreter A's rendering there were 19 sentences for Speaker 1 and 35 for Speaker 2. Interpreter used 26 sentences for S. 1 and 44 for S. 2.

<table>
<thead>
<tr>
<th>Speaker 1</th>
<th>Speaker 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Interp. A</td>
<td>Interp. B</td>
</tr>
<tr>
<td>sim.</td>
<td>32</td>
</tr>
<tr>
<td>non-s</td>
<td>68</td>
</tr>
<tr>
<td>Interp. A</td>
<td>Interp. B</td>
</tr>
<tr>
<td>sim.</td>
<td>42</td>
</tr>
<tr>
<td>non-s</td>
<td>58</td>
</tr>
</tbody>
</table>

Table 4. Percentage of simple and non-simple S's.

Table 4 shows that judged by the proportion of simple and non-simple syntactic structures used by both interpreters, Speaker 2 is being interpreted in a more casual register than is Speaker 1. It also appears that less complex syntax, with greater speaking rate and smaller pause time, leads to greater speed.

I also examined as part of the syntactic analysis false starts and non-agreement between subject and verb:

<table>
<thead>
<tr>
<th>False Starts</th>
<th>Non-agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spkr. 1</td>
</tr>
<tr>
<td>Spkr. 1</td>
<td>2</td>
</tr>
<tr>
<td>Spkr. 2</td>
<td>16</td>
</tr>
</tbody>
</table>

Table 5. False starts and non-agreement across speakers.

Coherent organization and grammatical accuracy as indicators of more formal register show again the difference of register in the speakers. These indicators, however, may be affected by interpreter performance; Interpreter A makes more false starts in interpreting for Speaker 2, but the reverse is true of Interpreter B.
Intonation

Roach (1983) lists four functions of intonation: *attitudinal*—conveying emotions and attitudes; *Accentual*—denoting prominence and stress; *grammatical*—indicating features of syntax and grammar; *discourse*—signaling expectation of flow and turn-taking. He describes the semantics of intonation patterns thus: A fall is "associated with completeness and definiteness," a rise, with "incompleteness and uncertainty or questioning," a fall-rise, with "feelings of hesitation, contrast, reservation, or doubt," a rise-fall, with "strong feelings of approval, disapproval, or surprise," and a wider pitch range "tends to be used in excited or enthusiastic speaking."

Bolinger (1975) corroborates by explaining this within the context of the physiology of speech and the nervous system. He states that the "universal lowering of pitch towards the ends of unexcited discourse results automatically from running out of lung power," and that an "equally universal raising of pitch for questions and other keyed-up utterances is probably the result of higher nervous tension in the body as a whole, which has the effect of tensing the vocal cords."

The number of occurrences and their locations of rising and falling intonation within a syllable or larger unit were charted for the interpreters' performances, and are shown below.

<table>
<thead>
<tr>
<th></th>
<th>Speaker 1</th>
<th>Speaker 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>total</strong></td>
<td>92</td>
<td>145 (100%)</td>
</tr>
<tr>
<td><strong>falls</strong></td>
<td>71 (77%)</td>
<td>97 (67%)</td>
</tr>
<tr>
<td><strong>rises</strong></td>
<td>21 (23%)</td>
<td>48 (33%)</td>
</tr>
</tbody>
</table>

Table 6. Interpreter pitch changes across speakers.

I expected to find more intonation shifts in both interpretations of Speaker 2 because of his highly affect-laden personal narratives, but Table 6 indicates otherwise. The interpreters agree closely on Speaker 2, but for Speaker 1, Interpreter B has 27.2% more intonation.
shifts than she does for Speaker 2. This would not be expected from the literature on intonation and may indicate a problem in control of intonation for more formal registers, or it may come from an idiosyncrasy of the interpreter. Interpreter A shows more intonation shifts than Interpreter B for Speaker 2, and she distinguishes between registers across speakers by her use of intonation patterns. This seems to indicate that more formal registers require greater control of intonation; while a greater range is allowed and accepted within less formal registers.

**Lexical items**

Categories of lexical items examined were contractions (e.g. *I'd*), phonetic assimilations (*gonna*), repairs and repetitions, the word *and*, and more formal and less formal words and phrases.

<table>
<thead>
<tr>
<th></th>
<th>Speaker 1</th>
<th>Speaker 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Interp A</td>
</tr>
<tr>
<td>contr</td>
<td>19</td>
<td>12</td>
</tr>
<tr>
<td>assim</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>repet</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td><em>and</em></td>
<td>28</td>
<td>13</td>
</tr>
<tr>
<td>-formal</td>
<td>50</td>
<td>17</td>
</tr>
<tr>
<td>+formal</td>
<td>80</td>
<td>49</td>
</tr>
</tbody>
</table>

Table 7. Interpreters' lexical patterns.

We can see that both of the interpretations of Speaker 2 are more formal in diction than those of Speaker 1, but the lexical evidence is not consistent across interpreters and so is not a conclusive indicator of speaker register. The lexical evidence does indicate a difference in organization and cohesion of the discourse interpreted; e.g. Interpreter A shows a 120% increase in repairs and repetitions from Speaker 1 to Speaker 2, which does indicate a register difference in her interpretations. Indeed Interpreter A's register difference between speakers throughout shows a greater register difference than does Interpreter B's.
Summary

The analysis clearly shows that both interpreters used different registers for the two signed presentations. It also indicates a greater difference in register across speakers in the interpretation of Interpreter A. Both interpretations show the following properties indicative of their register. For Speaker 1 there was more pause time, crisper pronunciation, and more complex syntax in the work of both interpreters. For Speaker 2 in both interpretations there was greater speaking rate, use of more contractions, assimilations, use of *and*, more informal words and phrases, and simpler syntactic structures.

A's interpretation differed more from speaker to speaker than B's; specifically containing greater shifts in speaking rate, more pause time, intonation change, and syntax, difference, as well as fewer false starts. (11 repetitions and repairs interpreting Speaker 1 as against 5 interpreting Speaker 2).

Interpreter B made less distinct adjustments and showed greater inconsistency in registers across speakers, with more false starts and more intonation shifts for Speaker 1 than for Speaker 2, but less adjustment in syntactic structure and pause time.

Both interpretations included aspects of consultative and casual register as did both presentations by the original speakers, but there were differences in register indicators in the interpretations, implying that registers exist within ranges and lack discrete boundaries but have definable properties. Any given utterance will present itself as more or less in "X register," depending on its aspects and their interaction. Thus, the attempt to isolate and define register indicators so that they can be monitored and regulated in the interpreting process appears quite feasible and consistency is essential to register determination. A multitude of factors are involved in interpretation; perhaps some such description as this of register indicators and knowledge that consistency in their use is essential may reduce some of the stress the many problems of interpretation impose on interpreters and their audiences.

Implications for interpreter training
Register as text variety is 'embedded' in situation. It reflects individual experience...control of a range of different registers results from experiencing different kinds of situations demanding different kinds of behavior. (Gregory & Carroll 1978)

Ability to act effectively as interpreter in any situation is directly related to the interpreter's experience and knowledge. As Gregory and Carroll put it, the ability to manage register is no exception, and interpreters to comprehend and express registers appropriately need to have experienced a range of them. Training procedures should sharpen the students' ability to recognize individuals' use of register indicators, to expand their own range and regulating behaviors, and to monitor their own language performance in different kinds of communicative situations as well as during actual interpretation. Special attention needs to be given those indicators foreign to or not in the usual behavior of each student, and to the importance of the way indicators can act on one another as well as on the overall message. Ideally students of interpreting would acquire skill in register control through actual experiences in their lives, but most do not enter training programs with such background, nor can they be "given" the experience. Therefore, curriculum must be developed to address these needs specifically. The students need to be exposed to the linguistic behaviors and the opportunity to try them out in and out of the classroom.

Register is as well the realization of the semantic possibilities of language. It defines what can be meant in the situation. Register is, then, culturally determined, since it is the culture of a society which determines the patterns of environments in which language can occur. (Ibid.)

This point must never be forgotten, especially not by those who train interpreters. Register analysis must be done separately in each language--English and ASL--so as not to cause interference or confusion about how the culture of the users of each language determines what register is appropriate for what occasions. Register, as with all linguistic and sociological aspects of communication, must always be considered in context while realizing its dynamic nature. Interpretation itself is dynamic.

References
Bolinger, D.

Gregory, M. & S. Carroll

Joos, M.

McEdwards, M.

Roach, P.

Wardhaugh, R.
Speaker 1/Interpreter A

(That's why it's stay has been around for so long / because it has stayed / within the community / and it's been sheltered)

1. 'd like to talk a little bit about / the way deaf and
   hearing children learn language /////

2. now the typical American hearing child // learns English
   growing up //////////////

3. when they're born // even though they can't use the
   language overtly // parents will talk to them / using baby
   talk or whatever even // though the child may not understand
   at that point /

4. they will continually expose / the child / to spoken English /

5. plus there will be other family members / extended family
   and friends who will talk to the baby / play with the baby and
   expose the baby to English //////////

6. (cough) in addition there's um the media like tv and
   radio // which also provide additional auditory input //////////

7. and then the child develops // the knowledge of the rules //
   and the grammar of the language // intonation patterns //
um how to express their feelings and how to use the language

in different functions //

8. and that's just the natural acquisition process for a

hearing child ///

9. now when a deaf child // if they have deaf parents //

the deaf parents will use ASL with them all the time //

10. same way that a hearing child communicates with the hearing

parents ///

11. and the child will get to know // ASL's rules ///// know how to

show their emotions know how to use ASL in different

situations

12. so really they're very very parallel //

13. now those children who learn ASL from their parents: and

have this first language as their native language: they
tend to do better // in terms of learning English: and they
tend to be more skilled at English as a second language

because they already have: a first language

as a base /////

14. now this other group // of people that we're talking about
// are // deaf children who are born to hearing parents and
that's about ninety percent of the deaf population / who
are born to hearing parents //

15. a-and they usually do not know ASL // and so there's alot of
communication difficulties and problems //

16. and many parents do not know how to deal with deafness ///

17. and so they continue to try to expose the child to language
and they will continue to use spoken English with the child
even though the child cannot receive any of that input: ///

18. and their extended family and friends and they'll put the
radio on and do just like // as if their child were hearing /////

19. and so the child who's relying totally on the effort is
not getting the language that the parents think that they're

giving them /////

(so they do not develop the rules and the grammar and how
to express themselves in that language in different situations)
Speaker 1/Interpreter B

(Those are three reasons that ASL has managed under such difficult circumstances to survive through the years)

1. I'd like to talk now about // deaf and hearing children //
2. and how they / learn language and make a comparison between
   the two: ///
3. first let's talk about hearing children of hearing parents
   here in America for example //
4. they speak English //
5. the parents // they speak English and they bear a child and
   that child // as the child grows // the parents talk /
   whether the child understands or not
6. they continue to cont to speak //
7. they // they may the baby may or may not understand may
   look at them and not understand a word
8. but the parents the aunts the uncles the cousins the
   brothers sisters friends // everyone comes and talks at
   that baby //
9. the child is constantly bombarded with English as / he or
10. ty // radio and a variety of media // are constantly
bombarding that child till that child learns English
learns its rules / learns how to combine words and // how
to use inflection how to show emotion
// // // // // //

11. how to structure things like questions statements and
commands

12. ya know // all the inner workings of the English language

13. now let's compare that to a deaf child born of deaf parents

14. deaf parents sign ASL to that deaf child in the very same
way damn all day and // very same way that hearing parents
speak to their deaf to their deaf to their hearing child:

15. so therefore a child who is deaf of deaf parents grows up
learning the rules / gets comfortable with the language
in exactly the same way that an English speaking child
learns English from hearing parents

16. and their language is good

17. their first language / they have excellent first
language skills and they can transfer those language skills
to their second language when they learn English.

18. they tend to learn English more easily.

19. now let's look at the third case.

20. hearing parents who have a deaf child

21. you know out of all the deaf children born in the United States, out of all the deaf children born period ninety percent, are born to hearing parents.

22. now when that occurs there's a great deal of discomfort.

23. hearing parents often know nothing about how to teach a deaf child or what to do about a deaf child.

24. they will continue to talk just as they would to a hearing baby, even though the deaf child can't hear.

25. friends, relatives, and so forth will come over and talk at that child.

26. TV and radio will continue to be played but because the ears are closed, the deaf child is not getting the language input.

-----------------------------------------------

(so the deaf child grows up with no sense of language development—when they get to be five or six years old and go into school typically the deaf child doesn't know English but doesn't know ASL either.)
Speaker 2/Interpreter A

(no preceeding utterance-begin at beginning of the tape)

1. Well // after the birth of my son // now comes the
   interesting part //

2. I wanna talk 'bout about my experiences raising my son //.

3. now my son's name is Lawan //

4. now my name's Lawry my wife's name is Wanda so we took the
   first halves of our two names and put 'em together: //

5. and we got Lawan ///

6. now my wife decided not // to work the first year after
   the baby was born // and then we talked about what should we
   do //

7. ya know ish-is my wife gonna continue to stay home: and / do
   the mother role and I'm gonna continue to work /

8. well we talked it through and we decided why not reverse roles ///,

9. when my son was fourteen months old // my wife went to
   work and I decided // to stay at home /// to take care of my
   son

10. and lemme tell ya boy // 'what an experience" ////
11. ahh I couldn't believe it

12. I mean wanna talk about being at home // my routines at
   home and outdoors 'n shopping 'n doing all the
different kinds of things that I've learned taking care
of him //////

13. tell ya my son has gave has given me a lot of wonderfully
interesting activities and beached too /

14. and I'm really I'm amazed at mothers and how they can take
care of not only one child but s-several children
15. I don't know how they do it //

16. well ya know my son is a my st-son is s-deaf //

17. and he would try to communicate w-with me using these
different gestures //

18. and at first I didn't understand him and I thought he was
   just making things up: //

19. but ya know // that's not true at all

20. he was really communicating

21. he really had these ideas //
ready to go to the bathroom so I protect myself: //</n
35. so it was really funny I kinda watched his little games when he does this >/</n
(washing clothes is one of my favorite things to do to)
Speaker 2/Interpreter

(no preceding utterance—begin at beginning of the tape)

1. What I wanna talk about now is my experiences with my son //

2. my son's name is Larwan //

3. my name's Larry //

4. my wife's name is Wanda /

5. we took half of each of our names put it together and make Larwan: // //

6. my wife stayed home after the birth of our baby and / and took care of him for a year while I worked /

7. and then we talked about should we exchange roles should I stay home what should we do and should my wife go back to work: //

8. so we said hey why don't I stay home and / my wife go back to work /

9. and we agreed to do that

10. we had -t really good communication and cooperation: /

11. well Larwan // when he was fourteen months old // my wife went back to work and I took over the care taking of our
12. and it was very difficult to talk to you.

13. I went through some really tough times.

14. There are four things I'm gonna talk about.

15. The things I do at home. What I do shopping. The out of doors and our routines.

16. Those four things are the things I'd like to talk about as a housefather.

17. When I stay at home. Larwan gives. Does so many wonderful activities and he's so active. And gives me a lot of headaches too.

18. I think mothers are just fabulous who stay at home and have three four different kids you know.

19. Communication is one important thing to talk about.

20. My son Larwan is deaf.

21. And so we sign to each other.

22. But sometimes I think he makes up the signs.

23. Ya know he uses really weird signs.
24. but then it turns out that the signs are purposeful ya know
   and they're not off the wall //
25. so I have to watch real carefully and pretty soon I take in
   to what it was / that Larwan was saying //
26. and ya know it's funny I noticed that what he does is he's
   go virtual he picks up on everything that he'll watch what my
   wife and I do and then he'll pick up on those things / and
   use them himself
27. and they start out real gross and then they move to really
   refined //
28. 's fascinating to watch the development of those signs //
29. when we play we do so many things
30. we have in our house we have lots of rooms 'n //
31. it's a big house /
32. and a I have to really make sure that my house is childproof
33. I feel like I need to walk around with him on a leash //
34. but I don't
35. I want him to feel free ////
36. I'm fabulous for example at changing diapers
37. this is one of my skills //
38. when I first started I was a mess because he he pitched right into my face and all those kinds of things
39. but it happened one and only one time /
40. because now I know how to cover him up fast: //
41. and I can tell by looking at his facial expression whether
   I have to hurry or not: in covering up //
42. I think mothers do that
43. they learn / from their baby's facial expressions
44. I guess I won't go into that any further //

(Washing clothes is another thing I've enjoyed)
What is the role of perceptual salience in language acquisition? English represented in signed form has the same structural segments but differs in perceptual characteristics from English so represented. The later acquisition of the syntactic morphemes *aux* and *-ing* by three previously studied deaf children has generally been attributed to the lack of perceptual salience in the signed forms. More extensive data from two other children of deaf parents reveal other differences in acquisition of *-ing, '-s, -s, -d,* and the particle *to.* The conclusion from the new data is that the signs for representing these English morphemes have a very high perceptual salience but distortions in prosody that affect structure and meaning.

**Order & salience in the acquisition of grammar**

In *A First Language* (1971), Roger Brown speculated about reasons for the order of acquisition of thirteen grammatical morphemes that he studied. One intriguing possibility to explain the relatively late acquisition of *-s,* for example, is its lack of perceptual salience to a hearer-speaker of English. The possessive marker is indistinct and often slurred. An excellent test of this hypothesis is offered by the acquisition in English signed instead of spoken of this and similar forms. Gilman and Raffin (1975, Raffin 1976) have studied the judgments of grammaticality made by older deaf children using a signed English system in school to find the order of acquisition of these same thirteen morphemes. There were several differences in the sequence of their acquisition between these subjects and those of Brown (1971) and de Villiers (1973). Gilman and Raffin suggested that the differences could be attributed to teaching practices and the speaking habits of those communicating with deaf children, who had not acquired fluent language before school age. Meadow (1981) and Schlesinger (1978) have studied three young deaf children acquiring signed English in the home. They found that these children, signing from a young age, also acquire the English auxiliaries and the *-ing* form later. They explain this in terms of the manner in which these signs are formed; i.e. in terms of perceptual salience. Thus, the claim is that all thirteen of the morphemes are slurred and indistinct in signed English, as is *-s* in spoken English, and
this lack of perceptual salience causes the overall later acquisition.

It has been argued that signing English is an inadequate means of representing language and particularly the details of English grammar (e.g. by Marmor & Petitto 1979). It has also been argued that signing English is the only means of providing the deaf child with a representation of English that is freely and completely accessible to his one intact sensory loop (e.g. Meadow 1981). The visual system, however, is very different from the auditory, and rendering English by manual signs raises serious problems of fit between sign and speech, and of performance *per se*. The visual system gives rise to natural sign languages that are characterized (a) by their articulation of the space adjacent to the signer, and (b) by their incorporation of signs or parts of signs in one another and the modulation of base sign forms instead of concatenating affixes and auxiliary forms and accumulating lexical forms as is done by languages arising from the auditory system. The attempt to represent English, with its concatenation of affixes, particles, auxiliaries, and a rich lexicon in manual signs leads to a threefold increase in the length of time needed to utter a message when compared to spoken English or to American Sign Language (ASL) (Klima & Bellugi 1979). Signed forms of English have been invented by borrowing lexical items and their citation forms from ASL and devising new signs for some content words and for affixes like *-ing, -s, -’s, -tion, -ed*, etc. The unit of fingerspelling is the letter--one handshape per letter--and not the word as it is in ASL. Fingerspelling is more analogous to writing than to spelling (Hanson 1982). The signed English systems generally use letters of fingerspelling to make new signs for representing English affixes. Thus the regular past tense is signed by producing the base verb sign and adding the fingerspelled 'D', while regular plurals and the gender-marked non-past verb ending are signed with a fingerspelled 'S'. Aspectual *-ing* is signed by twisting the fingerspelled 'I', apostrophe-*s* by an 'S', and the article *the* by a 'T', with a twisting motion. The indefinite article is signed with a fingerspelled 'A'.

Most forms of the copula are made by changing the handshape ('A) of an ASL sign that means 'true', 'really', or 'there is' to fingerspelling letters: I for 'is', R for 'are', B for 'be' (in some systems, B-N for 'been'). English *was* and *were* are signed with the handshapes W-S and R or W-R, but with a backward motion, like the signs YESTERDAY and PAST, instead of forward like the sign TRUE (See Figure 2.) When there is a sign in ASL for a homonym of an English affix morpheme (FULL and *-ful*), or where English particles are themselves homonyms (the prepositional and the infinitive marking *to*), the sign is often adopted for both English forms. (See Wilbur 1980). Sign handshapes, for the most part, resemble the forms of the fingerspelling alphabet; e.g. the sign THINK is made with the index finger.
extended, as in the fingerspelled 'G', but in making the sign THINK, the hand is presented not in pronation pointing outward but in supination pointing inward to or touching the forehead. (See Figure 3.)

Figure 2. ASL signs (l.) and signed forms of the English copula (r.).
English signs are not modulated as are ASL signs (Klima & Bellugi 1979); i.e. they are not altered in accord with a morphological system. There is no systematic exploitation of space either. Extra signs do the work for signed English that modulations of signs do for ASL; with so many more signs in signed English utterances, they tend to be made smaller and with more rapid articulation than those in ASL utterances. It seems reasonable then to suppose that these conditions, smaller and faster formations, might make it difficult for a child to segment the language stream incoming in order to acquire function words and bound morphemes. In addition, the prosodic features—rhythm, pitch, and stress—of spoken English saliently contrast content words and root forms with function words and affixes. The placement of stress in sentences spoken to young hearing children may direct their attention to particular elements and so facilitate their acquisition (see e.g. Newport 1977). Signed English often displays a distorted rhythm very different from that of spoken English. How then would a child separate roots and content words from the forms usually stressless in English? With no such perceptual cues to alert children what should have attention, what do they pay attention to? What would knowing that tell us about the role of perceptual salience in language acquisition?

The present analyses were undertaken to provide a description of the early uses of four bound morphemes and the form *to* in signed English in order to discover more about the process of acquisition. The account will thus test the reasonableness of the Meadow and Schlesinger interpretation of bound morphemes as not perceptually salient for deaf children,
and will describe any pertinent aspects of speaking habits (i.e. manner of sign production) in communicating with young deaf children. It should also indicate some effects of perceptual salience, by contrasting bound morphemes in two perceptual modes, the auditory and the visual.

**Method: the subjects**

Many deaf children exposed to signed English are beyond the prime language acquiring years and are cared for by people who are just learning to sign. Many hearing adults, after several years of its use still sign only a poor approximation of English (Marmor & Petitto 1979) to the children. The acquisition of English by these children is thus a poor test of the system itself; it is necessary to examine the language of children in a fluent environment if one wants reliable information on acquisition. The parents most fluent in signed English tend to be deaf themselves. Two deaf children of deaf parents were the subjects of this study; both also have deaf grandparents on one side. Tony's father is a physical education teacher in a school for the deaf and his mother a homemaker. Alice's father is an administrator and her mother has been a teacher in another school for the deaf. Tony has a hearing brother two years younger. Alice has four older hearing and hard of hearing siblings. The next youngest of them was ten when Alice was born. The families live in different states and do not know each other.

Both sets of parents made conscious decisions about the language environment they would create for their children. Both have always been determined that their deaf child learn fluent English in a signed form, believing strongly that use of such a system would enhance the child's success in school and later life. Alice's parents decided her first language would be ASL, with gradual and casual introduction of English in signs. Their first goal was to make communicating easy for their child. With "easy" communication they believed Alice would "pick up" ASL and, later, English without strain, and that she would be comfortably bilingual. Tony's parents decided they would communicate with him only in signed and spoken English. In contrast to the laissez-faire approach of Alice's parents, Tony's carefully chose a system of signed English after reading research on the issue and studying two systems (Bornstein, Saulnier & Hamilton 1976, and Gustason, Pfetzing & Zwakow 1972). They expected Tony to "pick up" ASL later, in school, but they believed that English would
be hard for a deaf child to learn and that Tony would need all the help he could get from them to master English.

The parents' behavior matched their convictions. Alice's parents used ASL until she began bringing signs of signed English home from preschool at age three. They often code-switched with her and provided "instant translations." They did not study a particular system but already knew some signed English forms, though Alice did occasionally bring home a sign that they could not understand. Her parents engaged in very little teaching or correcting of her grammar, except in parent-child routines like naming body parts, naming the fruits in canned fruit cocktail, politeness formulae, and reciting rhymes. They also taught her fingerspelling by matching the handshapes with drawings of handshapes and large letters. Tony's parents corrected, prompted, and modeled sentences for him regularly, in spontaneous interaction as well as in songs and other routines. They made daily requests for him to display what he had learned in school. Alice's parents responded warmly to her vocalizations but did not demand speech. Tony's father expected speech to accompany Tony's signs at all times, although he could not always tell if voice was present; Tony's mother could reliably detect the child's speech.

The data

Alice was first recorded on videotape when she was 27 months old. Tony was 47 months old at his first taping session. The videotape records of spontaneous language are supplemented by Alice's father's diary records of language used in the home; together they account for the materials on which this study is based. A naturalistic longitudinal design was used in collecting the data. The children were videotaped monthly, Alice until her 65th month and Tony until his 55th. Tony was taped again at 66 months and Alice at 75 months. Parents, friends, siblings, and researchers were variously present at the taping sessions, which were situationally free, with the participants eating and playing with toys, filmstrips, animals, and books. The sessions varied in length but were usually two hours long or longer. The tapes were transcribed and checked by at least one native signer and another fluent signer. I transcribed several of the sessions myself and viewed all the tapes, checking their transcripts against them.
Transcriptions took the form of English word glosses in caps for standard signs and signs invented for English morphemes. Any differences from the standard description of a sign or any standard variations were noted, either by prose description or use of the usual notation (Stokoe et al. 1965). Translations were sometimes included in parentheses to clarify utterances. Note was made of English signs (i.e. those not from ASL but devised to represent English morphemes) and signs with handshape altered from the ASL form to a fingerspelled letter matching the initial letter of the printed word. Many signs, of course, required more than one English word in the gloss; these were shown with hyphens connecting the glosses. Fingerspelled words are shown with hyphens between each two letters. Pauses longer than those in normal utterances were marked though not measured. Extensive notes were written on the context of the interaction and put in brackets in the text.

**Results: Four bound morphemes**

The process of acquisition of four bound morphemes of signed English by the two children will be presented in detail: -ING, -‘S, -S, and -D. The first two are made with a fingerspelled letter presented with a twisting motion; the second two, -S and -D, are simply presentation of the fingerspelled letter. The most important findings are the distribution of the morphemes in the children's language and their treatment of them as bound forms, since that is related to perceptual salience.

Twisting letters, aspectual -ING: At 46-47 months both Alice and Tony produced -ING in imitation/recitation and in spontaneous speech. The refrain of "Santa Claus is Coming to Town" contains two aspectual -ING forms with the auxiliary. Alice imitated the first, TELL ING, and produced the second, COME ING, without help but incorrectly:

\[
\text{SANTA-CLAUS COME TO TOWN ING}
\]

She did not associate ING with the verb in the sentence and did not connect it to anything. It appeared as a free morpheme after a noun. A month later -ING appeared as a free morpheme in the first spontaneous utterance recorded with this morpheme:
...WRITE THAT NAME ING THERE

Here ING was not only misplaced following a noun but wholly inappropriate to the utterance and the surrounding context.

In the next two months Alice produced spontaneous utterances that show confusion of ASL structures with English:

- DOG CAT BITE ING
- YOU ARE GOOD GIRL DRIVE ING
- MY RED IS MIX ING (My red [bedspread] is all mixed up; i.e. in disarray)

The first utterance is in ASL word order but without ASL inflection on the verb and with English -ING instead. The second contains the first spontaneous combination of the auxiliary (and the appropriate one at that) with Verb + -ING; but the utterance melds two English structures together: N₁ + be + N₂ and Be + Verb + -ing. The third utterance puts a Be form with a verb + ING correctly, and gets the sequence right; but in English mix as used here is transitive and is not grammatical in the structure Alice produced. (English allows us to use the form "mix up" in this sense.) By 62 months Alice was using -ING correctly. At this point she appropriately contrasted progressive aspect with simple present (although number agreement is incorrect in the following example):

- ALL SNAIL IS SLEEP ING, LIZARD IS SLEEP ING, BEES TOO. ALL MORNING IT SLEEP

At the same age Tony used -ING correctly in a song, "Good Morning," but still not connected to a root. He also said and signed:

- CORKY IS CRY

when his brother was crying, using the English sign code correctly (i.e. with the letter 'I' hand), but not using -ING. He never used -ING spontaneously in the six months of taping. He used correct word order and used the auxiliary productively alongside utterances with
just a noun and a verb sign. When his father prompted a correction, however, Tony signed -ING three times appropriately with the auxiliary and five times inappropriately, dropping the auxiliary or just adding -ING at the end or the beginning of the utterance:

Father: EAT ING!
Tony: I AM EAT ING SPAGHETTI GRANDMA 'S
but
Father: WORK ING!
Tony: ING! I AM WORK HARD!

After five and a half years the children were still not consistent in their use of -ING, although Alice often used it spontaneously in appropriate contexts. She began to sometimes sign -ING while reading. Tony always signed it in stories and songs but never spontaneously. He developed a strategy of signing -ING any time his father indicated a correction was necessary, whether or not -ING was appropriate in the utterance; e.g.

Tony: DON'T WANT READ
Father: DON'T WANT TO READ
Tony: I DON'T WANT ING READ

Alice continued to expand -ING to new grammatical contexts such as questions correctly but still produced as many partial verb phrases; e.g.

I AM EAT

and

YOU TEASE ING ME?

but also such ASL confusions as

SOMEONE IS ANGRY ING

What is exciting about these last two utterances appears in the videotapes but not the glosses; in them -ING is connected to the root signs through the ASL process of compounding. The second sign of an ASL compound is produced less rapidly than the first, and the signs are assimilated in location (Klima & Bellugi 1979). That aspect of her
performance is a good indication that Alice has come to understand the relation between root and affix signs, at least for -ING.

Twisting letters, possessive -'S: The other twisting letter affix began to appear about the same time as -ING. Also, like -ING, -'S first appeared in the records in a recitation. The lines from "Humpty Dumpty" were a challenge Alice attempted frequently but could not get straight. The -'S is signed in almost every possible context:

1. No context; i.e. -'S at the beginning of an utterance:
   'S KING 'S MAN HORSE
2. Between a quantifier and the appropriate noun:
   ALL 'S KING HORSE 'S MAN
3. Between two nouns:
   ALL 'S HORSE 'S MAN
   'S KING 'S MAN HORSE
   CANT PUT MAN 'S KING
   HUMPTY-DUMPTY 'S KING MAN CANT PUT
   HUMPTY-DUMPTY 'S KING TOGETHER AGAIN
4. Between a verb and a noun:
   COULD PUT 'S KING

It is probably safe to infer that Alice did not understand the relations that obtain among king, horses, men and Humpty-Dumpty. The free-floating 'S indicates incomplete understanding both of its distribution and its semantic function. But between 51 months and 55 months of age Alice began spontaneously producing possessive 'S and liberally sprinkled it throughout her constructions, placed after numbers, verbs, and inappropriate nouns as well as appropriate ones.

Although Tony did not try various permutations the way Alice did in trying to recite, he did produce some similar utterances both in recitation and in spontaneous conversation. He tended to persevere, repeating a line or a phrase in the same way, or to ask for help until one of his parents supplied the right words, when he was having trouble remembering a verse or song. He tended also to repeat his utterances in conversation, seldom correcting them or
changing them on repetition, and sometimes duplicating anomalies. He produced - 'S at 47 months in a song about the ABCs, where it is really a plural marker, and in the utterance cited above about Grandma's house. Over the next months Tony produced utterances similar to Alice's, except that he never was observed to use -S with a number. Possessive -'S was produced appropriately in contexts like these:

Alice:
- NOT MINE CLARA 'S
- I GO TO KELLY 'S HOUSE OK?
- YOU ARE MOMMY 'S HUSBAND
- TELL GIRL 'S MOTHER

Tony:
- CORKY 'S BOOK NO! MINE!
- MADELINE 'S CAMERA, NOT OURS
- GO MADELINE 'S HOUSE, PLAY MADELINE 'S PIANO,
- DOG, CHAIR, ROCK, OTHER

But it was produced inappropriately in utterances like the following:

Alice:
- [pointing at a Goldilocks illustration] THAT MOTHER TO SOFT BED 'S
- FATHER BED 'S TO HARD
- BARRY 'S DOG '2 'S
- SHE SICK 'S MARK

Tony:
- [pointing at a book illustration] MY YOU MY YOU ARE DIRTY BOY 'S
- CORKY BOOK 'S
- MOTHER LOVE 'S CORKY

Alice's sentence about the beds refer to the Goldilocks story. The sentence about Barry's dog is a mystery. Perhaps Alice was trying to repeat the possessive marker for some kind of emphasis or was unsure of the placement so signed it twice to be sure of having at least one correct. One way to pluralize in ASL is through reduplication; possibly Alice thought a plural here called for a repetition of the affix. The fourth sentence, interpreted from context and further discussion to mean 'Mark made Mother sick,' also yields too few clues for a confident explanation. This -'S could possibly be a be -contraction. SICK in ASL has a wider semantic range and undergoes more modulations than in English; it can be modified in ASL to carry the causative meaning, but it is not so modified in Alice's utterance. The sign -'S is English, of course, but the sentence is not semantically possessive.
Tony is looking at only one dirty boy; so there is no need for plural. The second inappropriate -'S example, CORKY BOOK 'S, was uttered after the correct CORKY 'S BOOK NO!, indicating that the semantics are correct but the placement is slippery. Placement between the verb LOVE and CORKY may be confusion with the third person singular verb suffix -S. The children both signed two of three instances of -S appearing in the texts that they read at 65 and 66 months respectively.

The slipperiness or instability of -'S is evident in both children's language through the 66th month. By far the greatest frequency of use is in the 47-55 month period, when -'S was almost a favorite sign for both children. None of the uses of -'S appear compounded or connected to any other signs in the manner of compounds described by Klima and Bellugi. Possessive or contractive? Possible confusion of possessive -'S with the contracted copula requires some examination. The copula was productive for Tony in the first taping session but was not used productively in its contracted form. He did not use it contracted at all during the study. Alice's first use of -'S was, in fact, a contracted form of the copula, three months before she was observed to use possessive -'S. Both children used the signs for IS and WAS, and both confused WAS with WERE (and HAS with HAD), even when reading. In his spontaneous language, Tony also confused the copula with HAVE throughout the study. Both children also omitted the copula with past tense and predicate adjectives, signing, e.g., KELLY ANGRY PAST (i.e. they used the signed English tense marker PAST, for regular verbs as a free morpheme) instead of signing KELLY WAS ANGRY. But the former utterance is grammatical in ASL, which has no copula. Thus the utterance in Alice's corpus is explainable as an example of ASL, an explanation that does not seem to hold in Tony's case. At the same stage both children used the copula in questions and with predicate nominals; e.g.

Alice: WHERE IS BJ? WHERE 'S BJ 'S COOKIE?
        MY NAME IS ALICE
Tony:  DADDY IS A BOY MAN

Alice's confusion about the use of -'S could be attributed to the presence of two very different functions for the sign, but since Tony produces similar anomalies with -'S without using the contracted copula, this explanation seems unlikely for him.
Simple letter signs: The other two bound morphemes considered in this study (3rd pers. sing. -S, and regular past tense marker -D) were observed used by Alice as early as 38 months. Alice was reciting along with adults who were reading signs. Alice recited "Rock-a-bye Baby" with a Signed English (copyright) poster to look at. The line also includes a determiner that ASL does not have:

```
BLOW S THE POINT [to the poster] AND...
```

The line loses the sense of "When the wind blows, the cradle will rock/ When the bough breaks, the cradle will fall/ And down will come baby..." In a similar recitation, the housekeeper went through "Little Red Riding Hood" sign by sign:

```
Housekeeper: LITTLE
Housekeeper: RED
Housekeeper: RIDE
Housekeeper: D
```

```
Alice: LITTLE
Alice: RED
Alice: RIDE WAS SCARE
Alice: D
```

A single signed English sign translates as 'scare', 'afraid', or 'frightened', so that in the system users [fluent in English] add -D to the sign when they have in mind scared or frightened. If the signer does not know enough English to match words and signs, the result (e.g. AFRAID D = *afraided) may look strange; speech or speech writing often helps this matching. This is an early example of Alice's exposure to this problem of fit between the forms of language in her environment. It is also an example of an adult's separation of the root from the bound form; the housekeeper signed -D, not SCARE -D. If Alice did not yet understand about afraid and scare, this separation of root and affix could have contributed to their tendency to distribute the bounds forms almost at random; except, as I will explain below, -D does not have the same distributions in her language as the other signs discussed here. The sign -D is unusual in several ways.

Plural and 3rd pers. sing. -S: Both children used the -S sign spontaneously in both plural noun and non-past verb marking, though Alice used it rarely. The first recording of her use of the noun marker was made just before her fourth birthday and the first of the verb marker one month later. Tony was using the -S in both contexts when the taping began(47 months). The children's utterances reveal that the number and person restrictions remained only
partially mastered. At 48 and at 49 months Alice signed:

ELSIE AND TOM LOVE S [a month apart she signed this twice]
YOU FORGET S
CANT WALK S
GIRL DONKEY DRIVE S THAT [a girl drives a donkey in that picture]

Only the last utterance contains an appropriate use of -S, but it is in ASL word order (Fischer 1975, Liddell 1977). Tony produced similar utterances:

I LOVE S MOMMY
MOMMY SPANK S CORKY [to Daddy on his arrival home, about an event that had occurred]

At 55 months Alice still exhibited difficulties with the system in her spontaneous talk, although the example below may be a case of not knowing which collective subjects are plural:

I LIKE CANDY, D-O YOU LIKE IT? YES, ALL PEOPLE LIKE S.IT. MARK LIKE S IT. DAD MAD, I HAVE-TO SHARE CANDY ALL PEOPLE IF WANT MY CANDY

At 75 months, when Alice tried three times to recite the Pledge of Allegiance to the flag, never quite getting it right, she omitted the -S on "stands." In her spontaneous talk at that time she was also three times more likely to omit -S than sign it with verbs in otherwise English-marked utterances. Tony at 66 months omitted -S about half the time in his signing and used it once with a modal: CORKY WONT STOP S.

In contrast, Alice's spontaneous marking of plurality was appropriate from its first appearance at 49 months, and Tony's was adult-like from his first recording session. Alice omitted plural -S four times as often, and Tony three times as often, as they signed it; but they did not use it inappropriately to mark singular nouns or even irregular plurals like men. They did not mark irregular plurals at all (only men, women, children, and sheep were in the data). Perhaps this is because Plural encodes only number, while the verb affix encodes both number and person of the subject [Or in another reckoning, verb tense as well as subjects that must be classified as m., f., or n.]. At 49 months Alice paged through an animal alphabet.
This utterance was particularly notable because Alice had just signed the same meaning in ASL. She was explaining that the puzzle she had played with last night required three tries.

Tony asked at 47 months: WANT SEE MY TOY S?

This level of use was not, however, maintained when Alice attempted to recite. She produced, for example, these lines from "Baa Baa Black Sheep":

```
B BLACK SHEEP S HER S
3 BAG FULL
S FOR 3 BAG FULL
3 S FULL
3 BAG FULL
```

The -S floats through these the way -'S floated through "Humpty Dumpty." In two of the lines it is near the morpheme it belongs to, BAG, but not affixed or even adjacent to it. The last attempt suggests that Alice could manage the noun or the affix but not both, as she deleted the -S when her mother supplied BAG. As one of the first bound morphemes Alice produced, -S was imitative and partially memorized in recitation mode. Later, in recitation it still gave her trouble. At 46 months, however, -S was placed correctly after nouns to be marked plural and after verbs (but the number was inappropriate).

Regular Past Tense -D: Tony used the past tense -D correctly at least once in every session. At 50 months Alice engaged in metalinguistic talk about past tense. In reciting "Humpty Dumpty" she struggled between HAVE D and a special form HAD, which was used in the poem and by signers in Alice's environment:

```
HUMPTY-DUMPTY HAVE D D D PAST, YES, HAVE D PAST HAD
```

In signing this Alice revealed that she knew 'D' indicated past; yet she did not use the sign in spontaneous talk until her 62nd month.

There are no other indications in either child's talk of this sort of metalinguistic awareness of
the bound morphemes. It may be significant, therefore, that -D is the only one of them that did not go through a stage of floating through the discourse. It may also be important that there is another way to indicate past time, i.e. another past tense marking in the system of signing English these children were exposed to: the ASL sign PAST is used to mean 'the past' and 'ago' as well as to mark irregular verbs for past tense; e.g. Tony signed:

    YOU ALREADY GIVE PAST CORKY! NOW ME!

Alice rarely used the regular -D but frequently signed PAST, often in contexts where -D was appropriate [according to signed English rules]. The difference between ASL (Alice's first language according to her parents' wishes) and signed English may have been obscured for Alice because PAST in the former is one of its bound morphemes borrowed from ASL with only minor change in function. Her following utterance is grammatical in ASL:

    KELLY ANGRY PAST

but she also signed MARSHA IS ANGRY ING, producing the I-hand copula and attaching -ING by positioning to an adjective. In signing English the sign PAST must be produced as part of the copula in predicates with adjectives, and the order is different. The use of the same sign form in both languages [or the language ASL and the signed English system] makes it hard even for linguists to determine which code some utterances belong to. Consequently it was at least as hard for Alice to keep them separate. That she knew -D was another way to represent past tense may be responsible for its stability in her language; unlike the other bound morphemes discussed here, it never floats in placement, even in recitations.

A free morpheme

Because the bound morphemes are treated by the children as if they were free and at least sometimes as if they were not semantic units, it may provide some insight to consider a free morpheme from Brown's list. Neither child used determiners very much (Alice did by 75 months), but both children used TO, both in directional meanings and in other contexts. This sign became something of an all-purpose preposition for Tony, as in:

    I WILL BE 5 YEARS OLD TO MARC  M-B-M-A-R-4-8
Tony regularly reversed verb and TO in signing infinitives, and both children produced more unmarked infinitives (without TO) than marked ones. As an infinitive marker, TO was productive by 56 months for Alice and by 60 months for Tony; but as a preposition, by 62 months for Alice and 52 months for Tony. At 65 months Alice signed "have to" as two words, but earlier she had used the single ASL sign that bears no formational similarity to the signed English signs HAVE and TO. Both children at between 60 and 66 months also inserted TO in formulaic utterances; e.g.

MAY I WANT TO WATER
IT IS TIME TO SHARE WITH FRIENDS TO DADDY

Undoubtedly these utterances are confused with others; e.g. "May I have some water" or "I want some water" with "I want to go to the bathroom." Thus TO is seen to be more accurately placed than -ING or -'S (i.e. more like -S) but to share some of their characteristics, the inconsistent use and overuse.

Despite the differences in their language backgrounds, Alice and Tony had similar difficulties in acquiring mastery of these morphemes. Alice's story is complicated by some mixing of syntax and selectional restrictions (like MIX and SICK) of ASL and English, but aside from that both children shared many characteristics in their use of these bound morphemes.

The role of routines

Alice first used the morphemes in recitations, later in spontaneous utterances. Both children treated them as free morphemes, and to some extent as semantically empty units, and unstable in placement. The children's similarities may reveal characteristics of deaf children's acquisition of English in this modality. Before we return to the issue of perceptual salience, however, the role of routine and recitation needs some comment.

As is clear from the examples presented above, the amount of prompted and memorized language in both children's performance is very large. All of Alice's earliest English utterances (not just the bound morpheme contexts) were quoted from story, verse, or parental refrain. Most of these were stories and poems recited or read over and over again. Politeness and discipline routines were also typically in signed English; e.g. Alice was regularly told:
She frequently pronounced the same judgment on others, including the dog, and signed the sentence when she saw the letter A in an alphabet game when she was 36 months old. With a few possible exceptions, her spontaneous utterances did not include non-routine English until after she was five years old. By 75 months she was appropriately code-switching between ASL and Sign English to accommodate her listeners; e.g. she asked her mother: WHAT THERE INSIDE?

Her mother told her to ask the hearing researcher, and she asked: WHAT IS INSIDE THERE?

In this session 19% of Alice's spontaneous utterances were in signed English. Although Tony's sole language was signed English, routines and rehearsed forms were also a major activity in his home. He sang songs and produced routines at the dinner table, in the bath, playing with toys and with his little brother. His parents, especially his father, constantly modeled, corrected, and demanded imitation of English from Tony. This attention to routines may be related to the production of the bound morphemes described here in several ways. First, young children do not usually understand the recitations they engage in. The many collections of children's utterances like "Jose, can you see by the dawn's early light," "One nation, invisible," or "Rounding version, Mother and child" are humorous partly because they show us how little of the content of our national and religious symbols children understand; but how many adults know what "curds and whey" are? In such contexts it may be easier to use language that makes little sense. The purpose of these recitation routines is primarily in the doing and not in their meaning. Children understand the frame of a joke and learn some apparently senseless part of it, engaging in the fun before they understand the content (Sutton-Smith 1976), and they may only gradually come to understand a story long after they have been repeatedly enjoying it, so they may engage in recitations, songs, and stories like the ones represented in this data for the interaction with others and for some awareness of the specialness of language. [See the references to Blount and Kempton (1976) in the previous article.] Such an explanation
would help de-mystify the children's free use of units like -'S. Having no idea of the semantic or morphological function of a sign, a child may make a global association of the form with a general register or discourse function, rather than with a specific grammatical function.

Such a general register marking function for the sign use might help explain the differences found in the morphemes; why, for example, the regular past -D appears to be understood but seldom used, why the nominal and verbal uses of -S seem to be separated while -S still floats through recitations, why -'S and -ING are used in so many different contexts. Some are only register markers, while others like -D have specific semantic and grammatical functions. On the other hand, if the things the children are saying are understood by them only situationally and not analytically, the children could be expected to have a high tolerance for meaninglessness. Nevertheless, the bound morpheme that is apparently best understood, -D, is used least.

Perceptual salience and the manner of production

Possessive -'S seems to be understood, i.e. used in utterances where it is semantically appropriate (as is -ING for Alice), but -S and -ING are used out of place in the children's sentences. Where is the perceptual salience in this? It has been suggested that morphemes acquired later are later because they appear as slurred and indistinct, as is the possessive form in spoken English. When researchers found possessive -'S similarly late in signed English, along with a general lag in acquisition of all thirteen of Brown's morphemes, they speculated that the morphemes were all slurred and indistinct in the sign mode. Such a lack of salience might lead to the inconsistence presence or absence of these morphemes in children's utterances, as is the case with -D; but why would it lead to the floating appearance or rampant over-generalization of -'S? Furthermore, when the morphemes are produced by the children, they are treated in timing and formation as separate words. They do not "stick" to their root signs, even when they are ordered correctly, with a very few exceptions. These signs are so completely articulated, so distinct, even emphasized, that one realizes that they are not small, slurred, or indistinct enough relative to the signs to which they should be affixed to convey their relational function. Signs exactly like the fingerspelled letters for 'A' and 'I' do stand alone in signed English; so why not S? Signs are made mainly of handshapes
and movements in signed English; 'T' twisted stands for 'the', a separate word; so why not 'S' twisted (-'S)? Perhaps a child, because in signing English letters have the same basic shape as signs, readily accepts loose letters mixed in with signs—as visible events they look just like other signs. The signed English morpheme PAST follows irregular verbs and other words; the children let it follow adjectives; perhaps in the children's developing rule system the letter-signs S, 'S, D, and I (I' twisted) are equally free to be signed independently even though the devisors of signed English legislate that they stand for bound morphemes [hence their appearance above as -S, -'S, -D, and -ING].

The bound morphemes and books

A number of examples above have been children's rendering of sentences in books. In order to compare the children's use of bound forms where they are unambiguously obligatory—in reading text—the two children were observed reading the same story. Both children frequently read and were read to from books that have printed text in standard English but with illustrations of the signs above the words they represent. (See Figure 4.)

![Figure 4. Signed English pictorial and print text.](image-url)

Because the text provides the bound morphemes, a comparison of the text with the children's reading in signs provides a measure of their performance in some obligatory contexts. Of course reading is very different from conversation. The effects of the difference may be mitigated somewhat by the children's familiarity with the books they read. Both had a number of storybooks, which they read frequently, from this series, and "The Three Little Pigs" was repeatedly "read" by both of them; there was no need for them to expend great
energy on discovering meaning. It is reasonable, therefore, to attribute their miscues while reading it to aspects of form more than to meaning. Indeed, they were both at the stage of reading where they progressed one word at a time, with no intonation [vocal or gestural]. Both children looked up at the adults with them from time to time, for reassurance apparently. Tony would just stop, point to a word and look at his father. Alice would often attempt a sign several times before she would ask for help, but she looked up often and also pointed to the signs on the page she was making. There are no cases of the non-past verb ending -s in the storybook, so that the discussion that follows is for irregular PAST, regular past -D, aspectual -ING, plural -S, and possessive -'S. Table 1 shows the children's treatment of the bound morphemes in the text:

<table>
<thead>
<tr>
<th></th>
<th>-ING</th>
<th>-'S</th>
<th>-S</th>
<th>-D</th>
<th>irr. past</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. omitted</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>% omitted</td>
<td>80</td>
<td>33</td>
<td>50</td>
<td>68</td>
<td>73</td>
</tr>
<tr>
<td>No. f'spelled</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>% f'spelled</td>
<td>33</td>
<td>10</td>
<td>9</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>No. correct</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>% correct</td>
<td>67</td>
<td>40</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tony</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. omitted</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>% omitted</td>
<td>10</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>No. f'spelled</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>% f'spelled</td>
<td>33</td>
<td>10</td>
<td>9</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>No. correct</td>
<td>5</td>
<td>2</td>
<td>8</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>% correct</td>
<td>100</td>
<td>67</td>
<td>80</td>
<td>87</td>
<td>81</td>
</tr>
</tbody>
</table>

1 May not equal 100% because of other errors.
2 Self-correction.
3 Some spoken as past while uninflected sign made (Alice 6, Tony 4).

Table 1. Bound morphemes in "The Three Little Pigs."

Alice omitted four of the -INGs but added -ING twice when it was not in the text:

| Text: TIME FOR YOU TO GO |
Alice: TIME FOR GO ING [self correct] TIME FOR YOU TO GO ING
None of the five INGs in the story was part of a complete present progressive verb phrase.
Two were in elliptical adjective clauses:
  text: MEET PAST A MAN CARRYING STRAW
  SEE PAST THE WOLF CLIMB ING
Two were gerunds in subject position:
  text: HIS HUFF ING AND PUFF ING
One is a participial adjective preceding a noun:
  text: BOIL ING WATER
Tony did not make these miscues. He generally read more slowly, made very few miscues, and tired easily.

That the children signed these forms is some indication that even these tiny drawings are not impossible to decipher; certainly the illustrated signs are hard for adults to decode at times. Alice, who gave more evidence of her strategies by "sounding out" or "shaping out" words, sometimes tried to make signs she did not understand. Two-part signs were especially difficult. Alice might get the first part but not the transition or the second part. Many of these are represented by a main figure signing, with arrows and/or hands in dotted outline to show changes. For example, Tony did not sign ONCE, and Alice mis-formed it and signed YOU as GO. (See Figure 5.)

Figure 5. Two-part signs pictured.

Perceptual salience

It should be noted that it was never intended for children to follow these figures; parents
were expected to be reading the stories to their children [and to be experienced in interpreting conventions for depicting motion in drawings]. The books are not consistent, however, because the authors made modifications after the series began. One problem the authors have struggled with is that they can follow the left-to-right convention for writing words in sequence but cannot use that convention for sequencing of sign actions within words; e.g. a right-handed sign that moves from the mouth to the ear moves backward and slightly to the right; the reverse image illustrated (as one would see the signer) shows the sign moving to the signer's right, which means it moves to the reader's left. This right-to-left movement disrupts the left-to-right sequence of standard print. Such backtracking could lead to omission of the final parts of signs or to the reversal of two parts. These children did omit second parts, but they did not reverse the order. Even in a figure where the root is shown in dotted lines and the bound morpheme sign in solid lines (Figure 6, r.), the children often signed the root word and omitted the other sign.

![Figure 6. Signed root (l.) & omitted modified form (r.).](image)

Certainly the bound morphemes in these small, complex drawings lack perceptual salience, and the children's signing omits many of the morphemes they represent. Alice, in particular, omits more of them than she signs. She often signs PAST in her conversation but never here. Yet Tony marks past tense with consistency, as he does in spontaneous utterances. He signs the same markers while reading and conversing. It should be noted that he is an extremely careful and precise reader, while Alice is more likely to jump around and experiment. Although the sign drawings are hard to decode, the context is English. Thus the overall pattern of bound morpheme use is one of mixed performance, as it is in conversation. The signing alone gives evidence for the suggestion that the affixes are not perceptually salient,
or essential to communication, for the children. The same treatment of multiple-part but uninflected signs is attributable to the drawings, since the children never omit parts of signs in their conversation.

The manner of production

Analysis of the manner of production, however suggests a very different interpretation. While the children did sign multiple-part uninflected signs, there was no special stress on, and no juncture between, parts of signs. When they signed the bound morphemes, however, there was. The children often looked up between making the root signs and the affix signs, sometimes dropping their hands in a long pause and then signing the affix with special emphasis. The stress they put on affixes contributed to the slow pace and deliberateness of their reading--like hearing children's over-correction during reading aloud; e.g. pronouncing *often* as "of ten" [uv and ten] while reading but not while speaking.

For these children, however, there is little if any difference between the production of the morpheme signs in reading and in spontaneous signing. These bound morphemes are typically separated from other signs and are stressed as much as word signs. Most of the time, when the children use them, in conversing or reading, they articulate them exactly as they do words. The adults around the children, moreover, generally overemphasize these morphemes, correcting the children's utterances with heavily stressed morphemes in isolation, and they separate root and morpheme in reciting responsively. The adults' tendency to over-emphasize and overcorrect may be leading the children to associate some special status with these signs and so miss their function relative to the roots.

Conclusions

From the records it is clear that form precedes function for these linguistic elements. Perhaps the salience that is missing is not perceptual but informative. To the children it may not be clear at all what those particular twists of the hand are doing for communication. If there is no apparent referent for them and their relational value is obscure, they may indeed appear purely formal and mystifying to the child--or perhaps meaningful at some discourse level. For Alice, by age seven, signed English was used for more conversation and less
recitation. Her spontaneous language at that point exhibited integration of the morpheme markers into the conversation, while her recitations still showed the prosodic pattern of her earlier productions. Perhaps the activities of practicing and correcting utterances not fully understood combines with "loose letters" to overwhelm the children in a way. The twisting forms (-ING, -'S) may be more salient perceptually in sign form than they are in spoken form. Thus, with normal stress, we might expect those forms to emerge before the untwisted ones. In the signing in this study, however, -ING and -'S were not observed in early reading/recitation, as were -D and -S, but the former were used in conversation somewhat earlier than the latter. Children imitating language they do not understand recode it if resembles something within their competence (hence "Jose" for "Oh, say"), but they garble it if it is not (Slobin & Welsh 1973). While hearing children have not been known to produce unconnected affixes, they presumably never hear the affixes alone and only seldom produced with stress. Deaf children DO see the affixes alone and stressed and looking just like the signed words they see. Perhaps if mothers stressed affixes in speaking, their hearing children would go through a similar stage of random affix expression. For preschool children, however, although elicited imitations are affected by stress, stress is more powerful on content words than on bound morphemes. The effect of stress change is governed by the type of feature stressed (Everett 1980). Herein may lie the real difference in the deaf children's signed English: the stress pattern is missing. Without the normal English stress pattern, the children lose important cues about what to pay attention to, what carries primary communicative information and what secondary information.

Supporting evidence comes from studies of older deaf children's writing. Although they typically omit functors and affixes in their writing, a few deaf children as described in two studies overemphasized these elements. When asked to write telegrams from complete sentences, some deaf adolescents omitted the content words and preserved the functors! (Maxwell 1974). In a written dictation task other deaf adolescents distorted and omitted content but retained most of the bound forms and functors (Maxwell 1983). Much of the literature on signed English emphasizes morphology and syntax and the importance of having them fully represented in signs. Several authors have insisted that the users of signed English must sign all the English functors and bound morphemes so that they will represent English accurately for deaf children, and in at least one study teachers of the deaf emphasized their greater concern about these elements than about an idiomatic lexicon.
It may be that a signed form of English will reflect this disproportion [e.g.
GO (a slight supinating action of the wrist) + ING (a large pronating action of the forearm as
the whole arm is abducted some distance out of the usual signing posture)]. It is possible,
however, that the stress and juncture distortion of normal English observed in these
children's signing of bound morphemes might be eliminated. ASL has devices for
compounding and contracting signs that involve timing changes and assimilation of location
(Klima & Bellugi 1979). An adaptation of these to signing English might be feasible; e.g. to
produce STUDY ING, the ING could be signed faster than STUDY and signed right at the
location of STUDY instead of in its canonical position at the extreme edge of signing space.
Signing of English in this rhythm is sometimes observed; the signers may be using their
prosodic intuitions for signing. Alice [who had ASL as first language was seen to sign this
way occasionally. If this way of signing English were to become widespread, or even if
parents could be found who sign in this way, it would be well worth while to compare the
children's development. My hypothesis would be that more normal stress would contribute
to more normal stages of acquisition. Much would depend, of course, on the overall timing
and clarity of the busy sign stream. These are issues generally related to language planning
among this population and to the roles of ASL, signed English, and written English in the
home and school rearing of deaf children.

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A LANGUAGE-INDEPENDENT MEASURE OF COMMUNICATIVE COMPETENCE FOR DEAF ADOLESCENTS & ADULTS

Mimi WheiPing Lou
Susan Fischer
James Woodward

Abstract

We present a conversation/interview measure for evaluating the communicative competence of deaf adolescents and adults. We also describe (a) the rationale behind its development; (b) its independence, by design, of the subjects' language variety, channel, or intermingling of the two; and (c) its use in a study of 40 deaf adolescents, the findings of which support the reliability and validity of this "language-fair" measure of communicative competence.

Judging language ability

The language abilities of prelingually and prevocationally deaf persons have been the subject of an enormous amount of scrutiny. There exist numerous tests to evaluate English competence (including measures of speech, speechreading, writing, reading comprehension, and the reception- tion of simultaneous communication), perhaps a few tests as well to evaluate Pidgin Sign English and ASL skills. However, no standardized tests have been developed to evaluate the ASL competence of prelingually deaf persons. Moreover, no reported measures have been developed to assess the language or communicative competence of deaf persons independent of the specific language code or channel used or preferred by the one tested; that is, no tests that permit the use of any language variety.
falling within the continuum between ASL and English represented manually or of any channel (manual, vocal, written, or any combination thereof).

The lack of such a measure is not surprising when one considers the difficulty of developing such a "language-independent" and "channel-independent" test of competence. Nevertheless, it is a serious problem for the fields related to the study of deafness. At present, investigators, educators, and other professionals cannot reliably evaluate the total language or communicative competence of prelingually deaf children or adults. Hence, they cannot examine its role in the development, adjustment, or success of deaf persons. All that can be evaluated and examined at present is competence in a specific language, using a specified channel or channel combination. In this paper we describe an attempt to develop a "language fair" measure of communicative competence; i.e. a measure that can be used no matter what specific language or mode or combination are used by the subject tested.

**English tests**

Over the years a great variety of tests of English have been administered to deaf children and adults (see Rodda 1982, and Johnson et al. 1980, particularly the chapters by McCaughrin & Rotunno for descriptions and listings). There are also several measures of manual and simultaneous communication, but these are largely focused on English skills (see Hatfield & Caccamise 1980 for a review). Probably the most comprehensive attempts to develop measures of communicative competence for deaf persons have resulted in test batteries with separate instruments for different components of the subjects' competence. Geffner and associates describe a test battery for young deaf school children that includes separate ratings for speech production, sign language production (not specified as English or ASL), a mode-independent and perhaps language-independent overall communication skills rating, a rating of speech reception, and a rating of speech intelligibility. They make the following argument in support of this battery:

In view of the fact that there are not tests currently available to adequately assess language, sign, and communication skills of young deaf children, these scales, while risking the element of subjectivity, may serve as a measure of ability. (Geffner et al. 1978)

Perhaps the best known battery for assessing the receptive and expressive communication skills of deaf adolescents is the (National Technical Institute for the Deaf of the Rochester,
NY Institute of Technology) "Communication Profile" (Johnson 1976., Johnson & Kadunc 1980). This battery includes separate assessments of hearing (speech) discrimination, speechreading without sound, speechreading with sound, manual reception, simultaneous reception, English reading comprehension, English writing intelligibility, and speech intelligibility. Although the separate instruments may be effective ways to assess ability in these components of total competence, there are several problems with this test battery approach. The most obvious difficulty is simply that the evaluation of the components of language competence taken one at a time may not produce an accurate picture of an individual's overall competence when communicating with others. This is a case where the whole is greater than the sum of its parts. At NTID they have found, for example, that a student's achievement on the test of speechreading may differ substantially from his or her ability to communicate with speech in face-to-face encounters. A similar problem is that many of the individual tests in the battery are based on single sentences unconnected to others in the test. Because effective lip-reading relies on the comprehension of context, an individual's performance on single isolated sentences may be a poor reflection of his or her skill in meaningful communication. The same may well be true of the tests of hearing discrimination, reception of manual communication, and simultaneous communication, all of which are based on the ten "Everyday Speech Sentence Lists" (Central Institute for the Deaf).

Another problem is that the battery includes no assessment of ASL competence (either receptive or expressive); nor are there measures of manual (English) or simultaneous competence. The individual tests in the battery allow the subjects no switching among different sign language varieties along the ASL to English continuum to communicate, it may be, more effectively than when they are restricted to only one variety at a time. Finally, a practical problem with using the test battery is simply the amount of time required to administer and score so many separate tests.

An interview measure

A different approach to assessment of signers' communicative competence has been developed by another NTID group. The Sign Communication Proficiency Interview (or SCPI, Newell et al. 1983) is described as an integrative test of functional communication
skills. It uses a single interview to evaluate receptive and expressive signing communication in a context. The SCPI is based on the Foreign Service Institute's Language Proficiency Interview (LPI), an established measure for assessing competence in a foreign or second language. Both tests rate performance in a semi-structured interview on a scale from 0 to 5, with '0' indicating no functional skills in a language and '5' indicating proficiency equivalent to that of an educated native speaker. The SCPI rating is based on a consideration of the following: vocabulary, grammar, comprehension, accent, fluency, and sociolinguistic or cultural knowledge --with the first three factors weighted more heavily. The SCPI is described as appropriate for assessing any signed communication falling within the continuum from ASL through PSE, excluding only invented English sign systems based totally on spoken and/or written English.

Unlike the NTID Communications Skills Battery, the SCPI evaluates communication in context and its evaluation of skill is functional. Like the former battery, however, the SCPI was not designed to evaluate communication when subjects slip from one signing variety to another or shift between spoken and signed modes or intermix different varieties along the ASL to English continuum--even though they do this in unique but rule-governed ways to communicate more effectively. This is not to say that the SCPI cannot be used in this way but that the intention is to evaluate competence either in a single sign language variety (the interviewer and interviewed intentionally omitting voice and lip movement) or in simultaneous communication (interviewer and interviewed using only the combination of speech and sign).

A conversation-based measure

The Conversational Communicative Competence Scales (CCCS) were developed by a group at the University of California, San Francisco, Center on Deafness. The aim was to test the communicative competence of deaf individuals without regard to the specific language, variety, channel, and/or intermingling of any of these that an individual chooses to use. The original purpose was to explore the interrelationship of linguistic, cognitive, and psychosocial functioning in a group of deaf adolescents who were first studied as toddlers. Earlier research on these children had found that communicative competence in toddlerhood (assessed when they ranged from two and one half to four years of age) predicted language skills, intellectual achievement, and social functioning in later childhood (Schlesinger &
The hypothesis for the adolescent round of the study was that the importance of early communicative competence would continue to hold true, and that linguistic, cognitive, and social functioning at adolescence would be closely intertwined.

The problem was how to evaluate the communicative competence of the deaf adolescents, who in 1982 reflected the full range of language and educational experience available to their deaf peers. In 1969, in the first round of the study, only four subjects (all profoundly deaf children with hearing parents) were enrolled in Total Communication preschool programs, with the remaining 36 in oral programs in the San Francisco Bay area. Over the thirteen years intervening, the subjects experienced a variety of changes in educational programs and language exposure. In 1982 we knew that the subjects whose competence we wished to evaluate included deaf adolescents who communicated in spoken English, some who had been exposed to only one of the invented manual English systems, some who had been exposed to different varieties of spoken and signed language combinations, and some who had been exposed to ASL. Complicating the picture even further, the length of experience with any particular language variety also varied across the subjects. Our dilemma, then, was to evaluate the communicative competence fairly across all the subjects in such a way that the scores of different subjects using different language varieties or different languages could be compared in meaningful ways. In addition, we did not want to exclude the possibility of crediting subjects with communication skills when they switched between different languages, varieties, or modes. With this aim we could not use existing measures, which evaluate skills separately in English (manual, oral, or written) and ASL, for such measures would not take in the many language users along the continuum between ASL and English, and would leave us the problem of trying to equate scores on very different measures. Our alternative was to develop, if possible, a single measure that could be used with subjects using any variety of signing and speaking or their mix.

**The interview protocol: SSSC**

Like the developers of the SCPI, we chose to use a structured interview-conversation format for our communication evaluation. A copy of the interview protocol can be found in the Appendix, but the guiding principles in developing the interview will be discussed here.
First, because the objective is to elicit the best communicative abilities of each subject regardless of his or her language preference(s), the interviewer must be fluent and comfortable using any of the manual-spoken language varieties along the ASL to English continuum that any subject might choose to use. Part of the interviewer's task is to encourage each subject to use whatever channel(s) and language variety or mixture of these that will enable him or her to communicate most clearly and completely. This is to be accomplished not only through explicit instruction to this effect but also by the interviewer's matching his or her own expressive language to that of the subject.

Second, the conversation is structured as a true dialogue, with the subject specifically requested to ask questions of the interviewer as well as respond to the questions asked. This two-way, back and forth, structure serves several purposes; the "chat" context helps put the subject at ease; it offers a broader opportunity to assess the subject's comprehension of the interviewer's statements and questions; and it allows the interviewer a chance to model the type of response (in terms of structure and content) expected of the subject.

Third, because the interview is to evaluate communicative competence and not knowledge, the range of topics covered in the conversation should be ones that are familiar to the subject.

Fourth, the conversation is designed also to tap a range of linguistic functions. Our protocol specifically asks each subject to describe, explain, tell an anecdote, offer an opinion and justify it, argue, and question. Similarly, the interview is structured to elicit a range of grammatical constructions, starting with simple phrases or sentences and moving towards requiring more complex constructions. The subjects are first asked to describe their own houses and make a few statements about a topic they are given at random, but towards the end of the interview they are asked to justify their expressed opinions about issues like gun control and whether deaf persons should be allowed to join the army.

There is also a rationale behind other components of the interview. The subjects are asked to tell about an accident they have experienced or to relate a funny story, in order to elicit language that has most likely been organized and rehearsed before. (It is rare that a person does not tell the story of an accident, for example, over and over again.) Another section of the interview asks the subjects to discuss some rule at home or school that they might like to
change. They are also asked in this section to present their argument for changing the rule as if they were addressing their parent or teacher or principal. This allows some opportunity, albeit contrived, for the subject to use a more formal register [see article by Shaw in this issue] than the one they might be using for their chat about past incidents.

Scoring

First a descriptive (not evaluative) rating was made for ASL versus English usage, using five anchor points:

A. This person is using ASL; there is very little or no English.
B. This person is using mostly ASL; there is some very obvious English mixed with the ASL.
C. This person is using a mixture of ASL and English; it is difficult to say which language the person is using.
D. This person is mostly using English, but there are some ASL aspects mixed with the English.
E. This person is using English; there is very little or no ASL.

Next, three separate scales are employed for evaluative rating of proficiency in the conversation: (A) communicative competence, (B) linguistic competence, and (C) organizational ability. The scale of communicative competence, in turn, is composed of four subscales:

1. quantity of information understood by the subject
2. quantity of information understood by the evaluator
3. ease in understanding the subject
4. fluency

The scale of linguistic competence is also composed of four subscales:

1. correctness of grammar usage
2. range of grammar usage
3. correctness of vocabulary
4. range of vocabulary

In addition, two other linguistic subscales were originally developed to evaluate sign and speech production, one for correctness and one for clarity. These subscales were ultimately deleted from the evaluation of linguistic competence, see below. The remaining scale of organizational ability is a single scale with the following factors contributing to a final rating: cohesion, pertinence, logic, and elaboration.

It is evident that the ratings for the scale of communicative competence are at the level of the conversation, those for the scale of linguistic competence are at the sentence and word level, and those for organizational ability at the level of paragraph or topic. Four anchor points are used to describe performance on each of these evaluative subscales, ranging from a low of many errors or problems or "restricted" range to a high of no meaningful errors or difficulties, or a broad range. For example, the descriptors for the anchor points of two different subscales are presented below:

Communicative Competence, Fluency:

1. Many hesitations; responses few and short; person unable to carry on any kind of extended conversation
2. Many hesitations; person has noticeable difficulty keeping a flow of communication
3. A few hesitations; person is generally at ease signing/speaking
4. No hesitations; person is totally at ease signing/speaking

Linguistic Competence, Range of Vocabulary Usage:

1. Uses only basic, limited set of vocabulary items; some difficulty in communication possible therefore
2. Vocabulary knowledge is somewhat limited; much repetition of similar vocabulary items
3. Generally displays an adequate range of vocabulary items
4. Displays a broad range of varied vocabulary items

Raters are asked first for a gross score on each subscale, for which they are required to
assign one of the four anchor points. This requirement forces raters to put each subject on either the positive or the negative side of the scale; there is no middle rating. Raters are also asked to assign a fine score for each subscale, which enables them to assign values midway between anchor points if they feel these will be more accurate.

The two other subscales originally developed for evaluating linguistic competence, in correctness and in clarity of production, were later dropped because it seemed that these "phonological" subscales would favor those subjects using manual expression over those relying entirely on spoken English; i.e. deaf speech is expected to be less correct and clear than that of hearing speakers, but deaf signing is not—in fact, deaf signing defines the standard of achievement. We discovered this intuition was well founded after all subjects were scored on the original two phonology subscales. As is reported later, the signers as a group did score higher on these two than did the mainly speaking subjects. Since the goal of this measure was to evaluate language competence fairly across the language varieties used by deaf Americans, we feel that ratings on the two phonology subscales should not be included in the final linguistic competence score.

Applying the measure

The conversation instrument as described was used to measure the communicative competence of subjects in the adolescent round of the longitudinal study introduced above. Thirty-nine of the original 40 subjects participated in this round of the study. Each subject came to the UCSF Center on Deafness with at least one parent for two full days of assessment. The measures used with each subject can be found listed in Table 1. The conversation measure was scheduled to occur in the early afternoon of the first day of assessment. This time was selected because it was early enough in the strenuous two-day assessment period that the subjects would not be worn out and also late enough so that the subjects had time to get to know the interviewer. The interviewer also was guide or host throughout the assessment period, so that by the time of the interview she had a good idea of how best to adjust her own communication to each subject. The interviewer for all subjects is a member of the research staff possessed of the unique combination of skills and experience required for the task: she is the hearing daughter of deaf parents, holds a Comprehensive Skills Certificate from the Registry of Interpreters for the Deaf, and has over
16 years of professional interpreting experience. She also had the experience necessary for establishing rapport with the subjects: she has had many years experience with deaf school children in a residential school and has had graduate training in counseling psychology.

A. Communicative Functioning

1. Conversation Measure, including scales for:
   a. Linguistic Competence
   b. Communicative Competence
   c. Organizational Ability

2. Reading Achievement (Stanford Achievement Test)

3. Written English Syntax

4. Story Recall

5.*(1)(1) Language-variety Familiarity (ASL, Signed English, SEE, Spoken English)

6.*(2)(2) Speech Intelligibility

B. Cognitive Functioning

1. Intelligence, including:
   a. WISC-R Performance Scale
   b. WISC-R Verbal Subscales: Information, Similarities, Comprehension

2. Reasoning (Piaget's Pendulum Problem)

3.*(3)(3) School Achievement (Grade)
C. Psychosocial Functioning

1. Self Image (Meadow Pictorial Scale)
2. Socioemotional Adjustment (Meadow-Kendall Scales)
3. Impulsivity (Rorschach, Draw-a-Line, Porteus Maze)
4. Quality of Mother-Adolescent Interaction

TABLE 1. LIST OF MEASURES USED WITH 39 SUBJECTS.

The task was described to each subject as an informal conversation, a "chat" that would run about 45 minutes. Each interview was videotaped to produce a split-screen image, one of the subject, the other of the interviewer. All interviews were scored by a trained rater, also an interpreter (CSC), with 6 years professional experience. In addition, for purposes of evaluating reliability of the scoring, two other raters scored separate subsets of ten interviews each.

The scores of the 39 subjects evaluated with the conversation measure ranged in the linguistic competence scale from 1.5 to 4, in the communicative competence scale from 1.75 to 4, and for the organizational ability scale from 1 to 4. Five subjects were judged to be using ASL ('A' on the ASL-English dimension), 7 judged 'B', 3 judged 'C', 6 judged 'D', and 18 judged 'E' (i.e. using only English).

Reliability

Each of the two additional scorers rated ten of the videotaped interviews for reliability. One was a prelingually deaf adult with professional sign language experience, a teacher of ASL at a local college. The second was actually the interviewer herself, but she was not asked to score the videotapes for reliability until more than a year after the interviews took place. The
first rater scored videotapes of ten subjects who did not use their voices (using instead ASL or a form of manually encoded English); the second rater scored ten tapes selected at random (i.e. scored both manual-only and speaking subjects). The inter-rater agreement between the first reliability rater and the original scorer ranged between 0.58 and 0.76 on the communicative competence subscale ratings, and between 0.52 and 0.81 on the linguistic competence subscale scores. Agreement between the second rater and herself more than a year earlier was higher: 0.83 to 0.97 on all the subscale scores. Different subscales were used by the two raters for the evaluation of organizational ability, and so these scores cannot be compared.

Validity

There is support for the validity of the conversation/interview as a measure of communicative competence in the pattern of relationships found between the scores on this measure and the other instruments used in this study. A full discussion of these relationships has been reported elsewhere (Lou 1986); only a summary will be presented here. The conversation scales of linguistic competence, communicative competence, and organizational ability show fairly strong relationships to the other verbal measures used, particularly to the three WISC-R verbal subscales, reading comprehension, verbal recall, and written English syntax. The correlations between organizational ability and these other language measures are highest, ranging from 0.44 to 0.64. These are followed by correlations between linguistic competence and the other language measures (r = 0.26-0.38). At the same time, the conversation scale scores show nonsignificant relationships to various social and psychological measures and to the nonverbal cognitive measures; i.e. the WISC-R Performance Scale. This certainly seems to suggest that despite differences among them, the scales of the conversation/interview measure are tapping something related to linguistic and linguistic-cognitive functioning.

Language independence

A separate issue of validity for this measure is that of language fairness or independence. As a language measure does it accomplish what it was intended to do? Does it evaluate the communicative competence of deaf subjects separately from the language, language variety,
and channel the subjects chooses to use during the assessment? Is it a fair measure of language competence regardless of which specific language variety is used for the evaluation? In this sense, as with the attempt to develop culture-fair intelligence tests, is this a language-fair measure of communicative ability?

We have some evidence suggesting it is. If the data are examined in terms of two language groups--those subjects using only using English and those subjects using something else--some interesting findings emerge. When the English subgroup is comprised of those subjects receiving ratings of 'E' on the ASL-English dimension, and the Mixed subgroup is comprised of the remaining subjects--those rated "A" (ASL only) 'B', 'C', and 'D'--then 18 subjects fall into the English subgroup and 21 in the Mixed subgroup. Using t -test statistics to compare the two groups, we found no significant differences in mean scores on any of the nine subscales of the conversation measure. There were significant differences only for the two "phonology" subscales, which were rated but subsequently eliminated from the linguistic competence scale for reasons presented above.1(4)(4) The difference in mean scores needed to show a significant difference between the two subgroups was also calculated for each subscale. The difference required for a significant difference at the 0.05 level was about 0.5, while for a difference at the 0.01 level, it was about 0.7.

The lack of significant difference between subgroups that are distinguished by at least one major difference in language variety can be interpreted in either of two ways. First, it could mean that the language measure is fair regardless of which language variety a deaf subject uses for the conversation, and thus the scores of subjects are comparable whether they fall into the strict-English subgroup or into the Mixed subgroup. Alternatively, it might be the case that the members of the two subgroups are not actually equal in language and communicative competence but that the measure unfairly equalizes them in evaluation. The data mentioned in support of the validity of the measure, however, suggests that the latter interpretation is unlikely.

Conclusion

The conversation measure described here has been used with good result in a study of deaf adolescents with a much mixed and varied language background. It was developed in order
to evaluate the communicative competence of these subjects independently of the specific language variety, channel, or mixture with which a subject might communicate most effectively. We have reported some evidence suggesting that the measure does in fact evaluate skills at least closely related to other language and verbal-cognitive skills. We have also presented some evidence supporting the suggestion that the measure is "language-fair" or language-independent. At the same time, it must be made very clear that this is a preliminary report on this measure. Much work remains to be done if this is to be accepted as a truly valid and "language-fair" measure of communicative competence. Some of the work needed includes: application of the instrument with a broader subject sample including deaf adults and native ASL users, examination of the cohesiveness and interrelationships among subscales by use of factor analytic techniques, and refinement of the anchor points for the subscales.

References

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1980 Assessment of sign language & simultaneous communication skills. In Johnson et al.

Johnson, D.

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Johnson, D. et al. (eds.)
INTRODUCTION

We're going to talk a little now, so we can learn more about each other. I'm interested in you and what you like to do. So I'll ask you some questions, and you can ask me questions if you want, OK? If you don't feel like answering a question, that's OK; you don't have to. Do you want to ask me anything before we start?

HOUSE DESCRIPTION

Let's start by your telling me about your house. What does your house look like? Can you describe it to me? Outside? Inside? What does your room look like?
That's different from my house. My house is . . . .
What do you like to do when you are home?

Activity description

Do you have something that you are really good at doing--that you're an expert at?
Can you tell me how to do that?

Personal incident

Have you ever had a really bad accident? Can you describe that to me?
(Or, describe the funniest thing. . . .)

Short topics

OK; as a change I'm going to give you a topic and you talk a short time about it.
You can give me a topic too. We'll take turns. Do you want to start first or shall I?
Possible topics: pets cats dogs sports
                 hobbies friends TV, movies books

Serious Topics: Personal opinion

--I'd like to ask your opinion on a couple of topics. (Choose two only.) You heard about
President Reagan and the Pope and President Sadat being shot? What do you think should
be done to prevent people from being shot (about gun control)?
--Do you think women should be included in the draft?
--Do you think deaf people should be allowed in the army?

Rules

Someday you'll probably be a parent and have children too; right? Well, I'd like you to
imagine now that you are a parent and that you have a child that is the same age as you.
(How old are you now?) OK; your child is now --- years old, same as you. What kind of
rules would you make for him or her?
Why do you choose those rules?
How about at home (or school) for you now? What kind of rules do your parents (teachers, principal) have for you?
Do you agree with those rules? Why (not)?
Are there any (or which rule) would you like to change?
OK; let's say that your parents are willing to listen to your reasons to change that rule. What would you say to them to convince them to change that rule? (Pretend I'm your parent, or teacher, and you try to get me to change that rule).

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*James Woodward* is a Research Scientist in the Gallaudet University Research Institute, Washington, DC.

**UNIVERSAL CONSTRAINTS ACROSS SIGN LANGUAGES: SINGLE FINGER CONTACT HANDSHAPES**

James Woodward

*Introduction*
Linguists investigating American Sign Language (ASL) have expressed interest in a theory of marking for sign language phonology; i.e. the level of sublexical structure in sign language analogous to but not dependent on the phonological level of spoken languages. Battison (1974) and Siple (1978) are notable pioneers in recognizing physiological constraints on manual signs. Lane (et al. 1967) and Poizner and Lane (1978) have attempted to find perceptual bases for similarities in formational aspects and to develop a feature analysis of handshapes and locations by using tests of perceptions of a visually degraded signal. Frishberg (1975) and others (Woodward & Erting 1975, Woodward & De Santis 1977) have shown that signs in ASL and French Sign Language undergo natural language change, comparable to "unmarking" in spoken languages. Boyes (1973) proposed a four-stage model of handshape acquisition of ASL. McIntire (1974, 1977) retained the notion of four stages but slightly modified the description of the handshapes acquired in each stage.

As De Santis (1980) has pointed out, however, much of this hypothesizing about sign language is based on data from White middle class linguistic consultants. Moreover, most studies have used data from the performance of only one or two consultants. De Santis (1980) and Woodward (1978a) attempted to expand studies of marking by looking at certain locations and handshapes across nine different sign languages from five different sign language using groups.

In this paper I will examine the phenomenon of single finger sign contact in data from ten different sign languages. Table 1 summarizes the sources, but it should be noted that only some of the data were collected by trained linguists, notably those from ASL, FSL, India, Providence Island, and Rennell Island. Despite difference in compilers' disciplinary training, all sign languages show the same patterns and similar frequencies for handshape formation.

<table>
<thead>
<tr>
<th>Language</th>
<th>Source</th>
<th>Lexical entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>American</td>
<td>Stokoe et al. 1965</td>
</tr>
<tr>
<td>2</td>
<td>Australian</td>
<td>Jeanes et al. n.d.</td>
</tr>
<tr>
<td>3</td>
<td>British</td>
<td>B.D.A. 1960</td>
</tr>
<tr>
<td>4</td>
<td>Finnish</td>
<td>S.L. Commission 1973</td>
</tr>
<tr>
<td>5</td>
<td>French</td>
<td>Oleron 1974</td>
</tr>
</tbody>
</table>
The hypothesized relationships are shown below:

<table>
<thead>
<tr>
<th>Language</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>French Sign Language</td>
<td>American, Finnish, French, Swedish</td>
</tr>
<tr>
<td>British Sign Language</td>
<td>Australian, British</td>
</tr>
<tr>
<td>Asian Sign Language</td>
<td>Japanese</td>
</tr>
<tr>
<td>Indigenous SL₁</td>
<td>Providence Island</td>
</tr>
<tr>
<td>Indigenous SL₂</td>
<td>Rennell Island</td>
</tr>
<tr>
<td>Unknown affiliation</td>
<td>Indian (New Delhi)</td>
</tr>
</tbody>
</table>

The French Sign Language group is the best researched of these hypothesized SL families. Old French Sign Language (OFSL) was used until about 1880, at which time it was forced underground by oralists' prohibition of deaf instructors in France. Modern SL in France is a highly restricted version of OFSL. ASL is historically related to OFSL, but there is evidence of a heavy language mixture and possible creolization of FSL with indigenous varieties of SL in the United States from about 1817 (Woodward 1978b). Von der Lieth (1967) points out that Swedish and Finnish Sign Languages are related to OFSL, but modern FSL, ASL, and Swedish and Finnish SLs are not mutually intelligible. (See Jordan & Battison 1976, [1987], and Battison & Jordan 1976 for a discussion of intelligibility across sign languages.)

The British Sign Language group may have a tenuous connection with OFSL, but seems to be a separate group of directly related (by colonization) languages distinct from the FSL group. Stokoe (1965: xxxii) reports much more difficulty in establishing communication with British signers than with French signers. It is important to distinguish between communication of signers and mutual intelligibility of sign languages. The former can and often does occur without the latter (See Battison & Jordan 1976).
Japanese Sign Language is not related historically to the French or British groups, although it appears to have some connection with sign languages used in Hong Kong and on Taiwan.

Indigenous sign languages are those used in isolated deaf communities with no connection to other sign language users. Providence Island in the Caribbean is extremely isolated and has three to six times the normal (0.1%) incidence of deafness—at least 17 deaf people out of about three thousand (Washabaugh, Woodward & De Santis 1978). Signers there use a sign language different from those on mainland Colombia, of which Providence is a province.

The other indigenous sign language, reported by Kuschel (1975), in contrast to that of Providence Island, is used by only one deaf man and his immediate neighbors on Rennell Island, a Polynesian outlier, which has approximately 1,200 persons and a history of no other deafness in twenty or more generations.

Indian Sign Language (of the New Delhi region), though influenced slightly by British and American sign languages, definitely belongs to a group different from any so far discussed (Vasishta et al. 1980).

With the foregoing data, I here examine the relative frequencies of signs using handshapes with single finger internal contact. There are four possible handshapes involving single finger internal contact, but not all sign languages make use of all four of them. The four are index contact (‘F’ handshapes), mid contact (‘8’ handshapes), ring contact (‘7’ handshapes), and pinky contact (‘6’ handshapes).

**Analysis.**

Table 2 shows the occurrence in the ten sign languages of signs with single finger internal contact handshapes when all the signs in the published corpus are included. Table 3 shows the distribution when numeral handshapes (i.e. ASL 6, 7, 8, 9) and signs borrowed via fingerspelling from spoken languages are included. Both suggest an implication ordering: if the language has handshapes with ring finger contact, then it will have others with little finger contact; if little finger contact, then middle finger contact; and middle finger contact handshapes imply the presence of index finger contact handshapes. As would be expected,
the frequency of the index finger contact is greater than that of the others.

Table 2. Actual frequencies of signs with 1-finger contact handshapes
(All signs included).

<table>
<thead>
<tr>
<th>Language</th>
<th>Signs</th>
<th>Index</th>
<th>Middle</th>
<th>Pinky</th>
<th>Ring</th>
</tr>
</thead>
<tbody>
<tr>
<td>American</td>
<td>1692</td>
<td>3.70%</td>
<td>0.20%</td>
<td>0.00%*</td>
<td>0.00%*</td>
</tr>
<tr>
<td>Indian</td>
<td>896</td>
<td>2.70%</td>
<td>0.10%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Australian</td>
<td>919</td>
<td>2.40%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>British</td>
<td>325</td>
<td>2.20%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Finnish</td>
<td>2974</td>
<td>1.40%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>French</td>
<td>872</td>
<td>3.90%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Japanese</td>
<td>1078</td>
<td>5.50%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Prov. Is</td>
<td>1035</td>
<td>5.30%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Rennell Is</td>
<td>217</td>
<td>0.50%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Swedish</td>
<td>2541</td>
<td>2.30%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

* Occurs in the language but not in the data

Table 3. Actual frequencies of 1-finger contact handshape signs

*Occurs as a variant of restrained "W" handshape.
Handshapes are more marked as one moves right across the columns. Although neither ring nor pinky finger contact occur in the data, both do occur in ASL. Ring finger contact is slightly less frequent than little finger contact. Middle finger contact occurs in only two sign languages and then only in a very small number of signs. All sign languages make use of index finger contacting handshapes, but it does not occur frequently in any sign language.

The relative markedness of these single finger contact handshapes also holds when we look at the locations in which the handshapes are used. Table 4 shows that if such a handshape is used on the arm it can occur also in trunk location; if on the trunk, then also on the face; and if on the face, then on the other hand or in neutral space (zero tab). That is, if a handshape can occur in a more marked location, it tends to occur also in a less marked location (cf De Santis 1978). The data fit this implicational pattern nicely.

<table>
<thead>
<tr>
<th>Language group</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand or Zero Tab</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Face Tab</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Trunk Tab</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Arm Tab</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

*Table 4. Implicational ordering of locations where 1-finger contact handshapes may occur.*

**Feature explanation of single finger contact**

I propose the features + *ulnar* and + *central* to explain the differences in the frequency and use of single-finger contact handshapes in sign languages generally. Table 5 shows handshapes with these features specified:

<table>
<thead>
<tr>
<th></th>
<th>Index</th>
<th>Middle</th>
<th>Pinky</th>
<th>Ring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- ulnar</td>
<td>- ulnar</td>
<td>+ ulnar</td>
<td>+ ulnar</td>
</tr>
<tr>
<td></td>
<td>- central</td>
<td>+ central</td>
<td>- central</td>
<td>+ central</td>
</tr>
</tbody>
</table>
Table 5. Features on 1-finger contact handshapes.

It is obvious that *ulnar* is more heavily weighted than *central* because both index and middle finger contact handshapes, the least marked, have the feature *ulnar*; while pinky and ring finger contact have the more marked characteristic of + *ulnar*. A handshape with the feature *central* is more likely to occur than the handshape with + *central* (i.e. index vs. mid; pinky vs. ring). Assigning a marked characteristic (*m*), to the combination of + *ulnar* and + *central*, we obtain the description shown in Table 6:

<table>
<thead>
<tr>
<th></th>
<th>Index</th>
<th>Middle</th>
<th>Pinky</th>
<th>Ring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m central</td>
<td>m ulnar</td>
<td>m ulnar</td>
<td>m central</td>
</tr>
</tbody>
</table>

Table 6. Weighted features on 1-finger contact handshapes.

This analysis complements an earlier analysis of single-finger extension (Woodward 1982), in which I proposed that frequencies of signs with single-finger extension handshapes could be described with the features +/- *ulnar* and +/- *central*. The features *central* and *ulnar* are unmarked for single-finger extension handshapes, with the former being the more heavily weighted. A comparison of single finger extension with single finger contact suggests that for all handshapes that involve single finger manipulation, the features -*ulnar* and - *central* enhance the frequency of occurrence. If the remaining fingers are closed (as in single finger extension), *central* is more heavily weighted than *ulnar*, but if the remaining fingers are open (as in single finger contact), the more heavily weighted feature is *ulnar*.

With two possibilities for weighting the features differently, the preferred weighting is *central* heavy, *ulnar* light. Single finger extension handshapes, with the heavy weighting of *central*, are much more commonly found in sign languages than are handshapes with single finger contact (Tables 7 and 8).

<table>
<thead>
<tr>
<th>Language</th>
<th>No. of signs</th>
<th>1-finger extension</th>
<th>1-finger contact</th>
</tr>
</thead>
</table>
Table 7. Frequency of occurrence of 1-finger extension & contact signs (All signs included).

<table>
<thead>
<tr>
<th>Language</th>
<th>No. of signs</th>
<th>1-finger extension</th>
<th>1-finger contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>American</td>
<td>1692</td>
<td>16.1%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Indian</td>
<td>896</td>
<td>20.5%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Australian</td>
<td>919</td>
<td>16.8%</td>
<td>2.4%</td>
</tr>
<tr>
<td>British</td>
<td>325</td>
<td>20.6%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Finnish</td>
<td>2974</td>
<td>18.7%</td>
<td>1.4%</td>
</tr>
<tr>
<td>French</td>
<td>872</td>
<td>13.5%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Japanese</td>
<td>1078</td>
<td>23.9%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Prov. Is</td>
<td>1035</td>
<td>21.6%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Rennell Is</td>
<td>217</td>
<td>17.1%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Swedish</td>
<td>2541</td>
<td>17.4%</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

Table 8. Frequency of occurrence of 1-finger extension & contact signs (Numerals & borrowings excluded).

Conclusion.

This analysis of the frequency of signs with certain feature constellations in handshape
supports the contention that a theory of marking can be developed for sign languages along
the same lines as those for marking in spoken languages--only the physiology of the
articulating organs differs. The data from published descriptions of ten sign languages show
the same trends as those bound by Greenberg (1966); i.e. the occurrence of more marked
(more complex) units will imply the occurrence of less marked (more natural) units, and
more complex units will be less frequent than more natural ones. Moreover, the more
complex units tend to be acquired later in the individual’s language acquisition process.

We have seen, to recapitulate, that sign languages with single finger contact also have single
finger extension, and that there are many more signs with single finger extension in a sign
language than signs with single finger contact. The data from studies of children acquiring
ASL also indicate that handshapes with single finger extension are learned before or at the
same time as handshapes with single finger contact.

The same set of features, ulnar and central, can explain both single finger extension and
single finger contact. Languages with the feature + central will also have - central; languages
which have the feature + ulnar will also have the feature - ulnar. Furthermore, handshapes
that are - central will outnumber those handshapes that are + central, and
handshapes that are - ulnar will be more frequent than those that have the feature + ulnar.
For single finger contact (open handshapes), ulnar is more heavily weighted than central;
for single finger extension (closed handshapes), central is more heavily weighted than ulnar.

More research is obviously needed, especially comparative data from widely diverse sign
languages, before a theory of marking can be firmly established for sign language
phonology. Such pieces as we are able to fit together at this time, however, suggest a
strongly ordered hierarchy of marking for sign language handshapes and point to a natural
theory of phonology for all sign languages.

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Endnotes

1 (Popup)
1. * Not included in present analysis

2 (Popup)
2. *

3 (Popup)
3. *

4 (Popup)
4. 1 The decision to delete these two subscales as unfair to the oral deaf subjects is supported by the finding of significantly higher ratings for the Mixed subgroup than the English only subgroup (M = 3.87; M = 2.89) on the Correctness subscale (t = 3.94, p> 0.01) and on the Clarity of Production subscale (M=3.19; M = 2.64 (t = 3.13, p > 0.01).

5 (Popup)
5. As defined here, contact does not include restrained handshapes (e.g. the 'W' or "restrained '8'" as in HATE) in which the thumb holds down another finger. These restrained handshapes I consider three-finger extension handshapes, because restraint by the thumb also occurs in single finger extension (Woodward 1982) and two-finger extension (Woodward 1982).

6 (Popup)
6. Woodward (1985) suggested an analysis for single-finger and 2-finger extension without the feature central. The present analysis, however, suggests that it is useful to include the feature central in the explanation of both extension and contact handshape occurrence, even though the feature central is redundant for single finger extension.